Exam

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Write the negation of the proposition.
1) Emily has brown eyes.
A) Emily does not have green eyes.   B) Emily has green eyes.
C) Emily does not have brown eyes.   D) Jason has brown eyes.

Answer: C

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

The statement connects two individual propositions with the word and. State whether the entire statement is true or false, and explain why.
2) George Washington was the first president of the United States of America and France is in Europe.

Answer: True. Both individual propositions are true, so the conjunction is true.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Rephrase the statement as a conditional proposition with the form "if p, then q."
3) Showing up at the party is sufficient to get a door prize.
A) If you got a door prize, then you showed up at the party.
B) If you show up at the party, then you will get a door prize.
C) If you get a door prize, then you don't have to show up at the party.
D) If you don't show up at the party, then you will not get a door prize.

Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Decide whether the statement makes sense. Explain your reasoning.
4) I am very upset because the results of my biopsy were not positive for cancer.

Answer: Does not make sense. In this context, the word "positive" means "indicating the presence of." The fact that the results were not positive for cancer suggests that you don't have cancer. Perhaps there is an unusual explanation for why that would make you upset (e.g., masochism), but in general it does not make sense. (Explanations will vary.)
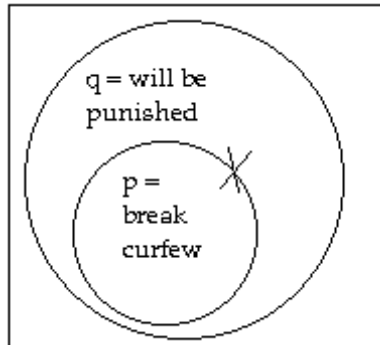
Identify the type of argument and determine its validity with a Venn diagram.

     5) Premise: If you break curfew, then you will be punished.
       Premise: Thelma was punished.
       Conclusion: Thelma broke curfew.

       Answer:

       The type of argument is called Affirming the Conclusion. We have p = you break curfew and q = you will be punished. The second premise asserts that Thelma was punished, which we show by putting an X in the q circle. However, the premise says nothing about whether Thelma broke curfew, so we put the X on the border of the p circle to indicate that we don't know whether the X belongs inside or outside this circle. The Venn diagram shows that the premises do not lead necessarily to the conclusion, so the argument is invalid. Thelma may have been punished for some other reason.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Evaluate the validity of the chain of conditionals.

     6) Premise: If I take a shower, I use soap.
       Premise: If I use soap, my skin becomes dry.
       Conclusion: If I take a shower, my skin becomes dry.
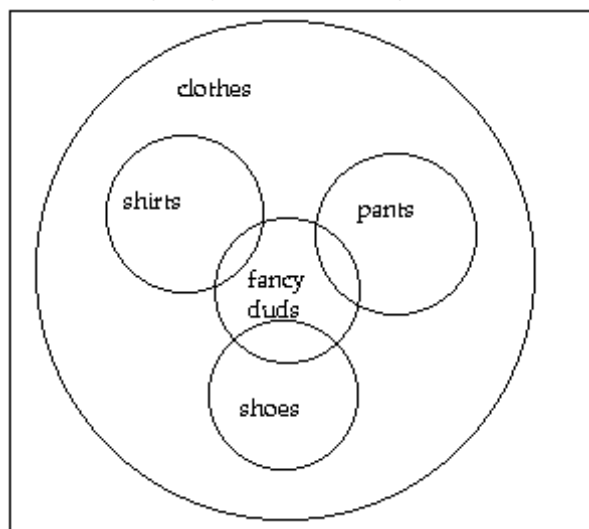   A) Valid   B) Invalid
       Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use your knowledge of the listed sets to draw a A Venn diagram illustrating the relationships among them.
  7) clothes, shirts, pants, shoes, fancy duds

  Answer: Answers may vary. One possibility:

Decide whether the statement makes sense. Explain your reasoning.
  8) Javier takes a shower to save time. When he gets into the shower at 6:50, he is out by 7:10. When he used to take baths, it would take him a quarter of an hour.

  Answer: Does not make sense. A quarter of an hour is 15 minutes, while the time between 6:50 and 7:10 is 20 minutes. It takes him five more minutes to shower, so to do it to save time doesn't make sense. (Explanations will vary.)

Create a simple three-line argument for the given form. Choose your example so that it illustrates clearly whether or not the argument is valid.
  9) Affirming the hypothesis

  Answer: Answers will vary. The structure of the argument should be as follows:
          Premise: If p, then q.
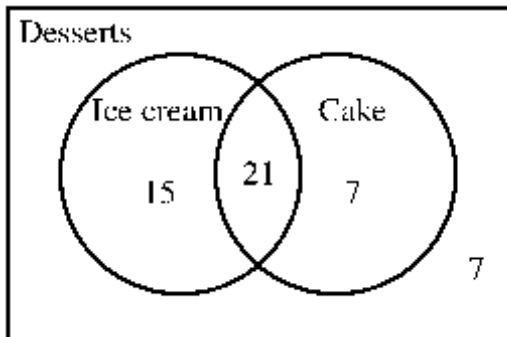   Premise: p is true.
          Conclusion: q is true.

          The argument is valid.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.
   10) The following Venn diagram describes the desserts people ordered at a party. Use it to determine how many people ordered ice cream but not cake.

   A) 15   B) 36   C) 21   D) 7
   Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

The statement connects two individual propositions with the word and. State whether the entire statement is true or false, and explain why.
   11) There are seven days in a week and there are 24 hours in a day.

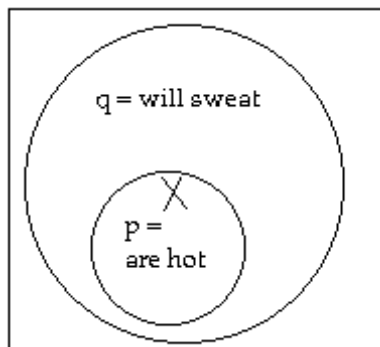   Answer: True. Both individual propositions are true, so the conjunction is true.

Identify the type of argument and determine its validity with a Venn diagram.
   12) Premise: If you are hot, then you will sweat.
       Premise: James is hot.
       Conclusion: James will sweat.

       Answer:

       The type of argument is called Affirming the Hypothesis. We have p = you are hot and q = you will sweat. The second premise asserts that James is hot, which we show by putting an X in the p circle. Because the X is also in the q circle, q must also be true for James. The Venn diagram shows that the premises lead necessarily to the conclusion, so the argument is valid.

Describe how the sentence is ambiguous.
   13) There was a 15% decrease in donations to the homeless shelter between 1996 and 2000, a year in which $50,000 was collected.

   Answer: It is unclear whether the year in which $50,000 was collected was 1996 or 2000.

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MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Write the converse, inverse, or contrapositive off the proposition, as indicated.
   14) If I pass, then I'll celebrate. (contrapositive)
      A) If I celebrate, then I'll pass.   B) If I don't celebrate, then I didn't pass.
      C) If I pass, then I won't celebrate.   D) If I don't pass, then I won't celebrate.
      Answer: B

Use braces to write the members of the set, or state that the set has no members.
   15) The days of the week
      A) {Monday, Tuesday, Wednesday, Thursday, Friday}
      B) {Saturday, Sunday}
      C) {Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Sunday}
      D) {Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday}
      Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

A reason for a particular political position is given. There may be other issues that are left unstated. Identify at least one unstated issue that could be the "real issue" of concern.
   16) Smoking should be banned in all public places. Second-hand smoke is harmful, causing lung cancer and heart disease.
      Answer: Answers may vary. One possibility: The person stating this opinion may not like the smell of cigarettes and cigars. He may not like the smell getting into his clothes and causing him to spend more money on dry cleaning. In addition, he may find second-hand smoke unpleasant because it irritates his eyes.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Choose the first set in the list natural numbers, whole numbers, integers, rational numbers, and real numbers that describes the following number.
   17) $\sqrt{23}$
      A) Rational numbers   B) Natural numbers   C) Whole numbers   D) Real numbers
      Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Decide whether the statement makes sense. Explain your reasoning.
   18) If "unconscious" means "not located in the United States," then Florida is not unconscious.
      Answer: Makes sense. You might think the statement does not make sense since the definition of "unconscious" is not actually "not located in the United States"and the assertion about Florida does not, on its own, make sense. However, the only question is whether if the definition were correct, the assertion about Florida would be correct. If "unconscious" means "not located in the United States," then "Florida is not unconscious" could be rephrased as "Florida is not not located in the United States" and then, replacing the double negation, "Florida is located in the United States." That assertion is clearly true. (Explanations will vary.)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Rephrase the statement as a conditional proposition with the form "if p, then q."
    19) I will lose weight if I diet.
        A) If I don't diet, then I won't lose weight.   B) If I diet, then I will gain weight.
        C) If I diet, then I will lose weight.   D) If I lose weight, then I will diet.
      Answer: C

Evaluate the validity of the chain of conditionals.
    20) Premise: If you loved me, then you would buy me a new car.
        Premise: If you wanted me to be happy, then you would buy me a new car.
        Conclusion: If you loved me, then you would want me to be happy.
        A) Valid   B) Invalid
      Answer: B

Determine whether the statement is true or false.
    21) If baseball is a sport, then the letter e is a consonant.
        A) True   B) False
      Answer: B

Use braces to write the members of the set, or state that the set has no members.
    22) The integers from 2 to 6 (inclusive)
        A) {3, 4, 5, 6}   B) {3, 4, 5}   C) {2, 3, 4, 5, 6}   D) {2, 3, 4, 5}
      Answer: C

Determine whether the statement is a proposition.
    23) One inch is 2.54 meters.
        A) Proposition   B) Not a proposition
      Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Determine the truth of the premises, discuss the strength of the argument, and assess the truth of the conclusion.
    24) Premise: I get lower grades than my best friend in math, chemistry, and English.
        Conclusion: My friend is smarter than I am.
      Answer: Answers may vary. Possible answer: Since the example is fictitious, there is no way to determine the truth of the premise. The argument is weak. Perhaps my friend studies harder than I do, perhaps my friend cheats in his classes, or perhaps I get higher grades in biology, history, and art. Moreover, academic smarts are only one measure of intelligence. Since the example is fictitious, there is no way to assess the truth of the conclusion.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Choose the first set in the list natural numbers, whole numbers, integers, rational numbers, and real numbers that describes the following number.
    25) 2.1
        A) Natural numbers   B) Integers   C) Rational numbers   D) Real numbers
      Answer: C

Determine whether the statement is a proposition.

26) Mary has a cat.

    A) Not a proposition   B) Proposition

    Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Decide whether the statement makes sense. Explain your reasoning.

27) The answer to the question is a whole number but it is not an integer.

    Answer: Does not make sense. The set of integers includes the whole numbers and their negatives, and thus the set of whole numbers is a subset of the set of integers. As such, all members of the set of whole numbers are also members of the set of integers. Therefore, if the answer to the question is a whole number it must also be an integer. (Explanations will vary.)

Draw a Venn diagram with three overlapping circles for the three given sets. Label the contents of every region. If a region has no members, state that fact clearly.

28) teachers, bowlers, and men

    Answer:
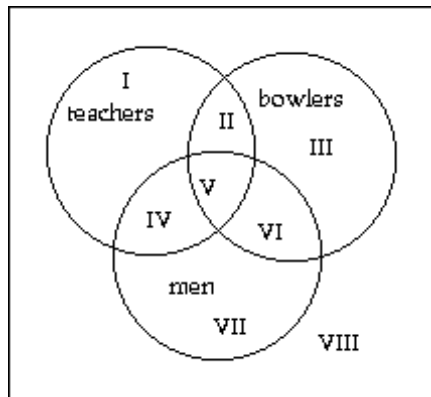
I = female teachers who are not bowlers
II = female teachers who are bowlers
III = female bowlers who are not teachers
IV = male teachers who are not bowlers
V = male teachers who are bowlers
VI = male bowlers who are not teachers
VII = men who are neither teachers nor bowlers
VIII = women who are neither teachers nor bowlers

Analyze the situation and explain how you would make a decision.

29) Your current cell phone company charges $30 per month for unlimited minutes. Another company charges $20 per month for the first 500 minutes plus 5¢ a minute for any additional minutes. Should you keep your current service or switch to the other company?

    Answer: Answers may vary. One possibility: The relative cost of the two options depends primarily on how many minutes per month you use. The new company's plan would cost ≤ $30 for up to 700 minutes a month, since $20 + $0.05(700 - 500) = $30. Therefore, if you expect to use less than 700 minutes a month, you would tend to profit from switching companies. However, there are other factors to consider:
Does one company have more dependable cellular service? Better sound quality? Better customer service? You should also look for hidden costs. For example, if you switch companies, you may need to buy a new cell phone.

Determine the truth of the premises, discuss the strength of the argument, and assess the truth of the conclusion.
　　30) Premise: Monday is one of the days of the week.
　　　　Premise: Thursday is one of the days of the week.
　　　　Premise: Saturday is one of the days of the week.
　　　　Conclusion: All the days of the week have names that end in "day."

　　　　Answer: Answers may vary. Possible answer: The premises are true. The strength of the argument is relatively
　　　　　　　　weak, since things aren't always named logically and consistently. (For example, the months September,
　　　　　　　　November, and December all end in "ember", but none of the other nine months do!) The conclusion is
　　　　　　　　true.

Draw a Venn diagram for the given sets. In words, explain why you drew one set as a subset of the other, disjoint sets, or overlapping sets.
　　31) athletes and high school students

　　　　Answer:
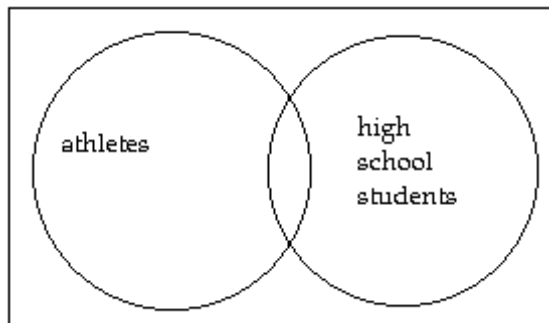
　　　　The sets are overlapping. It is possible for a person to be both an athlete and a high school students, but
　　　　not all athletes are high school students and not all high school students are athletes.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the statement is true or false.
　　32) If 9 + 2 = 19, then Canada is in North America.
　　　　A) True　　　　　　　　　　　　　　　　　　B) False
　　　　Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

The statement contains a double or multiple negation. Analyze the statement, explaining what it means.
　　33) The state assembly repealed the ban on anti-smoking resolutions.

　　　　Answer: Answers may vary. One possibility: The expression "repealed the ban" is a double negation. In repealing
　　　　　　　　the ban on the resolutions in question, the state assembly in effect allowed them. Since the resolutions are
　　　　　　　　"anti-smoking," a third negation is involved. A triple negation (not not not p) has the opposite truth
　　　　　　　　value as the original proposition p. In short, the assembly is now allowing resolutions that prohibit
　　　　　　　　smoking. If one were a lobbyist for the tobacco companies, this might be a setback.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Choose the first set in the list natural numbers, whole numbers, integers, rational numbers, and real numbers that describes the following number.
　　34) $\frac{3}{5}$
　　　　A) Real numbers　　　　　　B) Rational numbers　　　　　C) Integers　　　　　　　D) Natural numbers
　　　　Answer: B

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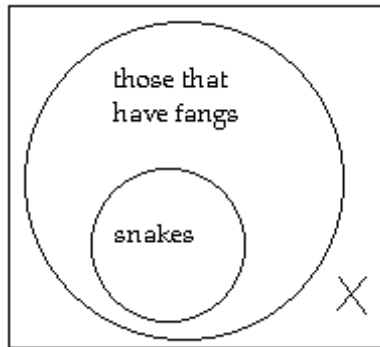SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Draw a Venn diagram to determine whether the argument is valid.

35) Premise: All snakes have fangs.
Premise: Teri's pet does not have fangs.
Conclusion: Teri's pet is not a snake.

Answer:

The X represents Teri's pet. The conclusion follows necessarily from the premises, and the argument is valid.

Decide whether the statement makes sense. Explain your reasoning.

36) The argument is weak, so its conclusion must be false.

Answer: Does not make sense. The strength of an inductive argument is not necessarily related to the truth of its conclusion. The argument "The earth rotates around the sun because I said so" is extremely weak, but its conclusion happens to be true. For a long time people found the argument "The sun rotates around the earth" to be quite compelling, but its conclusion turned out to be false. (Explanations will vary.)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the statement is a proposition.

37) Do you like this color?
A) Proposition   B) Not a proposition

Answer: B

Use braces to write the members of the set, or state that the set has no members.

38) The letters needed to spell the following words: tear, rate, rat, tea
A) {t, e, a, r, r, a, t, e, r, a, t, t, e, a}   B) {a, e, r, t}
C) {r, a, t}   D) {tear, rate, rat, tea}

Answer: B

Determine whether the statement is true or false.

39) If Florida is in the United States, then all rectangles are squares.
A) True   B) False

Answer: B

Use braces to write the members of the set, or state that the set has no members.

40) The whole numbers greater than 1 and less than 5
A) {1, 2, 3, 4, 5}   B) {2, 3, 4, 5}   C) {1, 2, 3, 4}   D) {2, 3, 4}

Answer: D

State whether or is being used in the exclusive or inclusive sense in the given statement.

41) Shaun will win the race if he eats carbohydrates beforehand or if he has slept well.

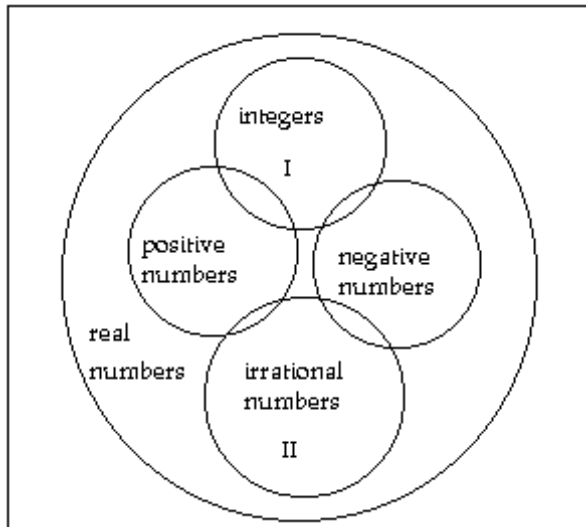   A) Inclusive   B) Exclusive

Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use your knowledge of the listed sets to draw a A Venn diagram illustrating the relationships among them.

42) real numbers, integers, positive numbers, negative numbers, irrational numbers

Answer: Answers may vary. One possibility:

Note that there is exactly one element in region I, since the number 0 is the only integer that is neither negative nor positive. Note also that there are no elements in region II, since each irrational number is either negative or positive.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the statement is true or false.

43) If a triangle is a parallelogram, then all rectangles are squares.

    A) True   B) False

Answer: A

Write the converse, inverse, or contrapositive off the proposition, as indicated.

44) If the sum of the interior angles of a geometric figure is 180 degrees, then the figure is a triangle. (contrapositive)

    A) If a geometric figure is not a triangle, then the sum of the interior angles is not 180 degrees.
    B) If a geometric figure is a triangle, then the sum of the interior angles is 180 degrees.
    C) If a geometric figure is not a triangle, then the sum of the interior angles is 180 degrees.
    D) If the sum of the interior angles of a geometric figure is not 180 degrees, then the figure is not a triangle.

Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Analyze the situation and explain how you would make a decision.
　45) You need a rental car for four days. The daily rate is $20 per day plus 20¢ per mile. The weekly rate is $100, and mileage is included. Which is the better option?

　　Answer: Answers may vary. One possibility: The answer depends on how many miles you drive the car. If you know you will drive less than 100 miles, then the daily rate is a better option, since $20/day × 4 days + $0.20/mi × 100 mi = $100. If you know you will drive more than 100 miles, then the weekly rate is a better option. If you aren't sure, then the weekly rate is probably preferable since the risk is limited. Even if you drove the minimum (zero miles), you would only spend $20 more by choosing the weekly rate. But for every 100 miles after the first 100, you would save $20 with the weekly rate. If you drive 500 miles, that's $80 in savings. You should also consider a hidden factor. If you might end up only needing the car 1-3 days, then the daily rate will tend to be a better option. However, if you might end up needing the car for 5-7 days, then the weekly rate is a better option since those days will not cost you extra.

The argument contains an example of the fallacy named in parentheses. Explain how the fallacy occurs in the argument.
　46) (Straw Man) Mayor Brown opposes a tax increase to build new schools. His opponent in the upcoming election states: Mayor Brown is not concerned with improving the quality of education for our children.

　　Answer: Answers may vary. Possible answer: Mayor Brown has not said that he is not concerned with improving the quality of children's education, merely that he opposes this particular tax increase to build new schools. (Perhaps he would prefer a tax increase to improve the current schools instead of building new ones, or perhaps he thinks the quality of education can be improved without raising taxes) Mayor Brown's opponent has distorted his views. Any argument based on a distortion of someone else's ideas or beliefs is called a straw man.

A categorical proposition is given. If it is not already in standard form, rephrase it. State the subject and predicate sets, and draw a Venn diagram for the proposition. Label all regions of the diagram clearly.
　47) Some flight attendants are men.

　　Answer: The subject set is "flight attendants" and the predicate set is "men."
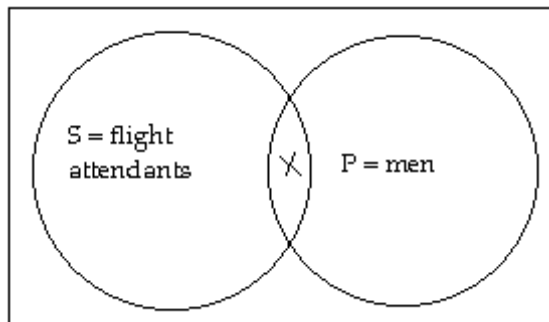

The X indicates that the overlapping region has at least one member. No claim is made about whether other regions also have members.

Draw a Venn diagram to represent the given information.

48) In a complex of 60 apartments, 40 apartments have cable television, 25 apartments have a dishwasher, and 13 apartments have both cable television and a dishwasher.

Answer: Answers may vary. Possible answer:
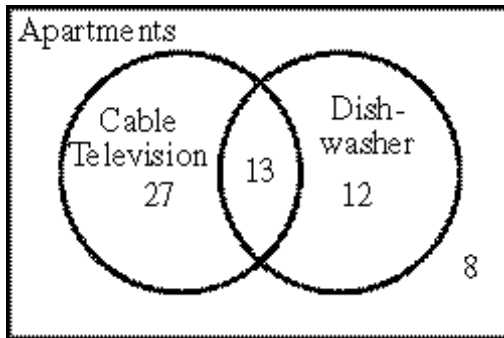
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use braces to write the members of the set, or state that the set has no members.

49) The positive-integer powers of 3

A) {3, 6, 9, 12, 15, . . .}　　　　　　　　　　　B) {1, 3, 9, 27, 81, 243, . . .}
C) {3, 9, 27, 81, 243, . . .}　　　　　　　　　　D) {1, 8, 27, 64, 125, . . .}

Answer: C

Two statements are listed in which p, q, and r represent propositions. Are the two statements logically equivalent?

50) p or q; not [(not p) and (not q)]

A) Yes　　　　　　　　　　　　　　　　　　　B) No

Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

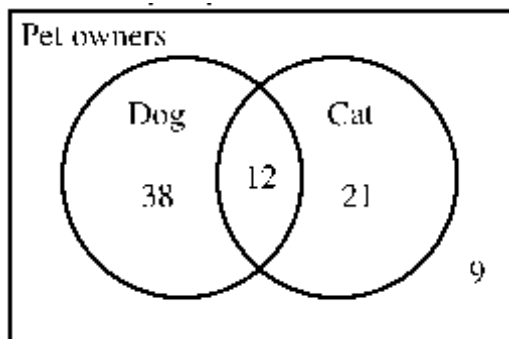Draw a Venn diagram to represent the given information.

51) There are 12 girls and 15 boys in a kindergarten class. 8 of the girls and 10 of the boys are right handed.

Answer: Answers may vary. Possible answer:
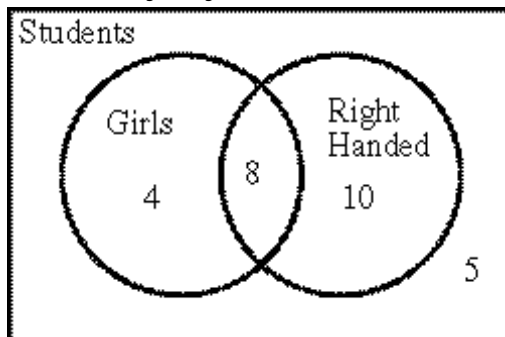
52) In a survey of 80 pet owners, 50 had a dog, 33 had a cat, and 12 had both a cat and a dog.
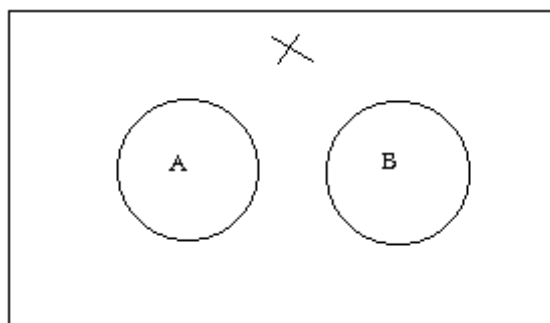
Answer: Answers may vary. Possible answer:

Decide whether the statement makes sense. Explain your reasoning.

53) A and B are disjoint sets, so an object is either a member of set A or a member of set B, but not a member of both sets.

Answer: Does not make sense. It is true that if A and B are disjoint sets, then an object cannot be a member of both sets. However, that does not mean it has to be a member of either set. It can also be a member of neither. The X in the following diagram represents an object that is a member of neither set A nor set B. If set A were the set of animals, and set B were the set of vegetables, then the X might represent a mineral. (Explanations will vary.)

Draw a Venn diagram for the given sets. In words, explain why you drew one set as a subset of the other, disjoint sets, or overlapping sets.

54) motor vehicles and cars

Answer:
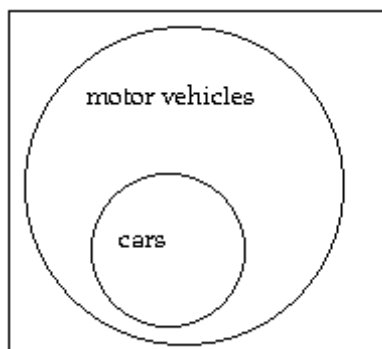
The set "cars" is a subset of the set "motor vehicles." Every car is a motor vehicle, but there are some motor vehicles, such as trucks, that are not cars.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

The argument given or described involves some kind of fallacy. Identify the fallacy.
    55) After getting new dishes, I started to sneeze. I must be allergic to the new dishes.
        A) Hasty generalization   B) Circular reasoning
        C) Personal attack (ad hominem)   D) False cause
        Answer: D

Solve the problem.
    56) The following Venn diagram describes the types of cookies in a bakery. Use it to determine how many cookies
        have neither chocolate chips nor walnuts.
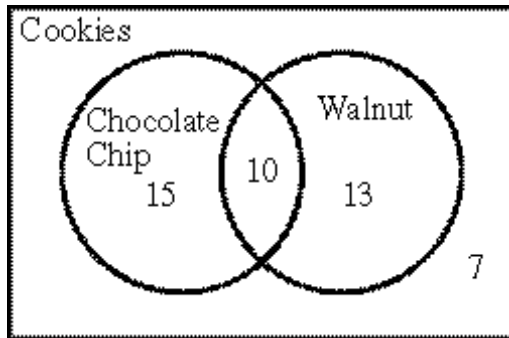
   A) 3   B) 17   C) 7   D) 10
        Answer: C

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

The argument contains an example of the fallacy named in parentheses. Explain how the fallacy occurs in the argument.
    57) (False Cause) Since I brought my umbrella, it didn't rain.
        Answer: Answers may vary. Possible answer: The premises tells us that one thing (bringing the umbrella)
                happened before another (it didn't rain), but they don't prove any connection between them. That is, we
                cannot conclude that bringing the umbrella was the cause of the fact that it didn't rain. The fact that one
                event came before another is not proof that the first event caused the second event.

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MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Make a truth table for the given statement. The letters p, q, r, s represent propositions.

58) q and (not r) and s

A)

q	r	s	q and (not r) and s
T	T	T	F
T	T	F	T
T	F	T	F
T	F	F	F
F	T	T	F
F	T	F	F
F	F	T	F
F	F	F	F

B)

q	r	s	q and (not r) and s
T	T	T	F
T	T	F	F
T	F	T	T
T	F	F	F
F	T	T	F
F	T	F	F
F	F	T	F
F	F	F	F

C)

q	r	s	q and (not r) and s
T	T	T	T
T	T	F	F
T	F	T	F
T	F	F	F
F	T	T	F
F	T	F	F
F	F	T	F
F	F	F	F

D)

q	r	s	q and (not r) and s
T	T	T	F
T	T	F	F
T	F	T	T
T	F	F	T
F	T	T	F
F	T	F	F
F	F	T	F
F	F	F	F

Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Draw a Venn diagram with three overlapping circles for the three given sets. Label the contents of every region. If a region has no members, state that fact clearly.

59) salty things, sweet things, tangy things

Answer:
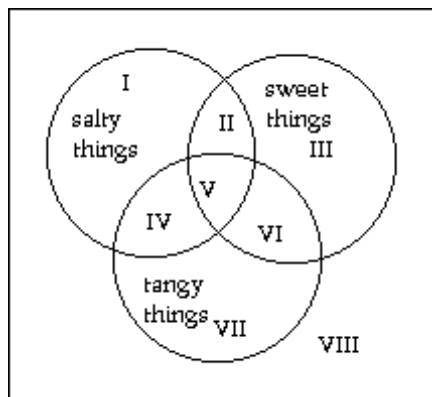
I = things that are salty, but neither sweet nor tangy
II = things that are both salty and sweet, but not tangy
III = things that are sweet, but neither salty nor tangy
IV = things that are salty and tangy, but not sweet
V = things that are salty, sweet, and tangy
VI = things that are sweet and tangy, but not salty
VII = things that are tangy, but neither sweet nor salty
VIII = things that are neither salty, sweet, nor tangy

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

State whether or is being used in the exclusive or inclusive sense in the given statement.
    60) I don't know if I should wear my new skirt or my new dress tonight.
        A) Exclusive   B) Inclusive
        Answer: A

Decide whether the argument is inductive or deductive.
    61) Practice makes perfect. Therefore, if I practice, I'll be perfect.
        A) Deductive   B) Inductive
        Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Determine the truth of the premises, discuss the strength of the argument, and assess the truth of the conclusion.
    62) Premise: 6 + 13 = 19
        Premise: 16 + 9 = 25
        Premise: 34 + 35 = 69
        Conclusion: Whenever we add an even number and an odd number, the result is an odd number.
        Answer: Answers may vary. Possible answer: The premises are true. The argument is relatively strong, and the
                conclusion is true.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Choose the first set in the list natural numbers, whole numbers, integers, rational numbers, and real numbers that
describes the following number.
    63) 0
        A) Rational numbers   B) Natural numbers   C) Whole numbers   D) Integers
        Answer: C

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Decide whether the statement makes sense. Explain your reasoning.
    64) Your argument is valid, but it isn't sound.
        Answer: Makes sense. An argument is valid if its conclusion follows necessarily from its premises, regardless of the
                truth of its premises or conclusions. An argument is sound if it is valid and its premises are all true. Many
                valid arguments have false premises and are thus not sound. For example:
                Premise: When I close my eyes, I become invisible.
                Premise: When I am invisible, I can speak Portugese.
                Conclusion: When I close my eyes, I can speak Portugese.
                The argument is valid, but its premises are clearly false so it isn't sound. (Explanations will vary.)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Decide whether the argument is inductive or deductive.
    65) The last four stoplights were green. Therefore, the next one will be green.
        A) Deductive   B) Inductive
        Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

A reason for a particular political position is given. There may be other issues that are left unstated. Identify at least one unstated issue that could be the "real issue" of concern.

66) I think term limits should be enacted for the Senate. A senator should not be allowed to serve more than two consecutive terms, because professional politicians become too focused on getting reelected.

Answer: Answers may vary. One possibility: The person stating this opinion may not like one of his current senators (or may even want the job for himself!). In addition, he may want the balance of power to shift from the legislative branch to the executive branch and may feel that term limits will give senators less overall influence.

Provide an appropriate response.

67) Consider the following ballot initiative:
"Shall there be an amendment to the state constitution to prohibit the state legislature from adopting any law which inhibits the freedom of religious expression?"
Explain the meaning of a "no" vote.

Answer: Answers may vary. One possibility: A "no" vote means that you believe that the state legislature should have the authority to restrict religious expression.

Decide whether the statement makes sense. Explain your reasoning.

68) The time I spend studying is a subset of the time I spend playing basketball.

Answer: Does not make sense. For this to be true, all the time you spent studying would have to be time you also spent playing basketball. This could be true if you spend literally no time studying or if you did all your reading while dribbling a basketball, but both possibilities strain credulity. (Explanations will vary.)

Draw a Venn diagram with three overlapping circles for the three given sets. Label the contents of every region. If a region has no members, state that fact clearly.

69) truck drivers, employed, unemployed

Answer:
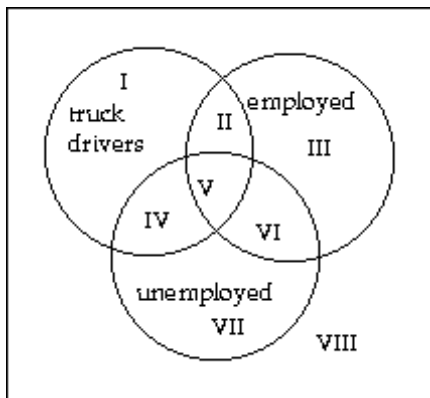
I* = truck drivers who are neither employed nor unemployed
II = employed truck drivers
III = non-truck drivers who are employed
IV = unemployed truck drivers
V* = truck drivers who are both employed and unemployed
VI* = non-truck drivers who are both employed and unemployed
VII = non-truck drivers who are unemployed
VIII* = non-truck drivers who are neither employed nor unemployed

*This region has no members.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Write the negation of the proposition.
70) Some athletes are musicians.
    A) Not all athletes are musicians.   B) Some athletes are not musicians.
   C) No athlete is a musician.   D) All athletes are musicians.
    Answer: C

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Draw a Venn diagram to represent the given information.
71) In a freshman class of 50 students, 30 students are taking math, 24 students are taking history, and 15 students are taking both math and history.
    Answer: Answers may vary. Possible answer:
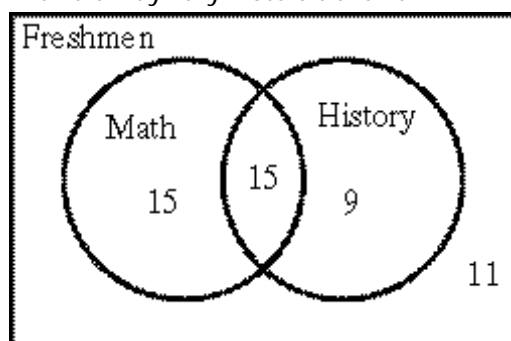
Describe how the sentence is ambiguous.
72) Our goal is to increase voter participation from 25% of the eligible voters, or 4000, to 50%.
    Answer: It is unclear whether 4000 is the number of eligible voters or 25% of the number of eligible voters (which would make 16,000 the number of eligible voters).

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Rephrase the statement as a conditional proposition with the form "if p, then q."
73) Having a computer is necessary for taking this class.
    A) If you take this computer, then you must have a class.
    B) If you have a computer, then you must take this class.
    C) If don't take this class, then you must not have a computer.
    D) If you take this class, then you must have a computer.
    Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

The statement contains a double or multiple negation. Analyze the statement, explaining what it means.
74) The councilman does not oppose the anti-pollution measure.
    Answer: Answers may vary. One possibility: Since "does not oppose" is a double negation, the councilman supports the measure. The term "anti-pollution" is an additional negation, so in supporting the measure, the councilman is acting against pollution. A triple negation (not not not p) has the opposite truth value as the original proposition p.

18

A seemingly simple argument is given. Identify at least two hidden assumptions.

75) We should not vote for the incumbent because he has already been in office for three consecutive terms.

Answer: Answers may vary. One possibility:
Four consecutive terms is too many.
The incumbent is running in the election.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Decide whether the argument is inductive or deductive.

76) All U.S. Presidents have come from the contiguous 48 states. No person from Alaska can be President.

A) Deductive   B) Inductive

Answer: B

Two statements are listed in which p, q, and r represent propositions. Are the two statements logically equivalent?

77) not (p and q); (not p) and (not q)

A) Yes   B) No

Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Decide whether the statement makes sense. Explain your reasoning.

78) Insurance policy A costs $250 and has no deductible. Insurance policy B costs $275 and has a $500 yearly deductible. Candace thinks the extra $25 per month is worth it to get the $500 deductible, so she buys policy B.

Answer: Does not make sense. Candace is paying an additional $25 per month ($300 per year) to get a $500 deductible. However the deductible (what you pay out of pocket before the insurance kicks in) is a cost, not a benefit! All other things being equal, policy A is clearly the better deal. (Explanations will vary.)

A reason for a particular political position is given. There may be other issues that are left unstated. Identify at least one unstated issue that could be the "real issue" of concern.

79) The dictator of a foreign country has enacted a ban on all firearms, citing prevention of accidental deaths among children as the rationale.

Answer: Answers may vary. One possibility: The dictator may believe that an unarmed populace is easier to control.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Write the negation of the proposition.

80) Some people don't like walking.

A) Everyone likes walking.   B) Some people don't like driving.
C) Some people like walking.   D) Nobody likes walking.

Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

A categorical proposition is given. If it is not already in standard form, rephrase it. State the subject and predicate sets, and draw a Venn diagram for the proposition. Label all regions of the diagram clearly.

81) Beggars can't be choosers.

Answer: In standard form: No beggars are choosers.
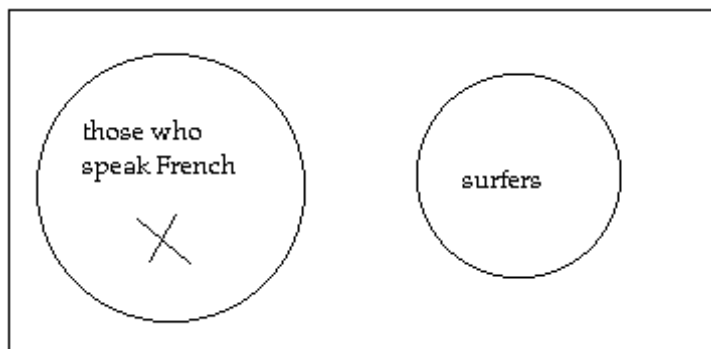The subject set is "beggars" and the predicate set is "choosers."
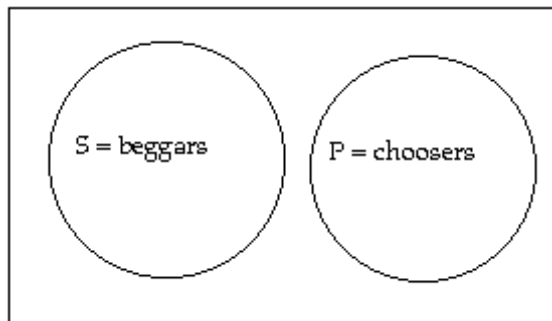
Draw a Venn diagram to determine whether the argument is valid.

82) Premise: No surfers speak French.
Premise: Pierre speaks French.
Conclusion: Pierre is not a surfer.

Answer:

The X represents Pierre. The conclusion follows necessarily from the premises, and the argument is valid.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

The argument given or described involves some kind of fallacy. Identify the fallacy.

83) A television commercial shows two people who fall in love while wearing a certain brand of blue jeans.
A) Limited choice   B) Appeal to ignorance
C) Hasty generalization   D) Appeal to emotion

Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Decide whether the statement makes sense. Explain your reasoning.
      84) I drew a Venn diagram for two sets, and I only used one circle.

          Answer: Makes sense. Generally it takes two circles to draw a Venn diagram for two sets, for example when the sets are overlapping or disjoint. Even when one set is the subset of the other, it generally takes two circles to draw a Venn diagram. However, if the two sets are equal, then they have precisely the same members and the same circle describes both sets. Incidentally, if two sets are equal then they are both subsets of each other. (Explanations will vary.)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the statement is a proposition.
      85) $0.3 = .03$
        A) Not a proposition   B) Proposition
        Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

The argument contains an example of the fallacy named in parentheses. Explain how the fallacy occurs in the argument.
      86) (Appeal to Emotion) A television commercial shows a happy, attractive family dining at Ma & Pa's Restaurant.

          Answer: Answers may vary. Possible answer: If we can consider this an argument at all, it has the form
                  Premise: You want your family to be happy and attractive.
                  Conclusion: You should eat at Ma & Pa's Restaurant.
                  The argument appeals to emotion, not logic. The advertisers hope that the image of happy and attractive people will evoke positive emotions and make you want to eat at the restaurant. In other cases, the appeal is to negative emotions.

Decide whether the statement makes sense. Explain your reasoning.
      87) Your argument is sound, but it isn't valid.

          Answer: Does not make sense. An argument is valid if its conclusion follows necessarily from its premises, regardless of the truth of its premises or conclusions. An argument is sound if it is valid and its premises are all true. By definition, if an argument is sound it is also valid. To put it another way, the set of sound arguments is a subset of the set of valid arguments. (Explanations will vary.)

Analyze the situation and explain how you would make a decision.

88) You are leasing a summer home for twelve weeks and are required to cut the grass every week. You can buy a new power mower for $340 and sell it at the end of the summer for $100. You can rent a power mower for $20 per day. The neighbor's son will charge you $10 per hour for 2 hours and provide his own equipment. Which is the best option?

Answer: Answers may vary. One possibility:
Option 1 (buying a power mower) will cost you $240 ($340 – $100).
Option 2 (renting a power mower) will cost you $240 (12 × $20).
Option 3 (hiring the neighbor's son) will cost you $240 ($10 × 2 × 12).
The cost of each of the three options appears to be equal. Let's see if there are hidden factors that might help you make a decision. Options 1 and 2 require you to mow the lawn yourself each week. Your time could be spent doing other things (including earning money!), so this is a hidden expense. Then again, you might appreciate the opportunity to exercise, get a tan, and meet the neighbors; so depending on your preferences this could actually be a hidden benefit. Option 1 requires you to resell the mower at the end of the summer. Unless there is a buyer in place (e.g., has the owner of the home or the hardware store already offered to buy it back?), you will have to spend time and energy negotiating the sale of the used mower. Option 2 most likely requires you to pick up and drop off the mower each week. When all the costs are considered, Option 3 might end up being the least expensive, but there are some hidden factors there, too. What happens if the neighbor's son does an unsatisfactory job? What if it takes him more than 2 hours to complete the job? Are you obliged to pay him for the additional time?

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

89) The following Venn diagram describes the cars on a used car lot. Use it to determine how many Fords are on the lot.
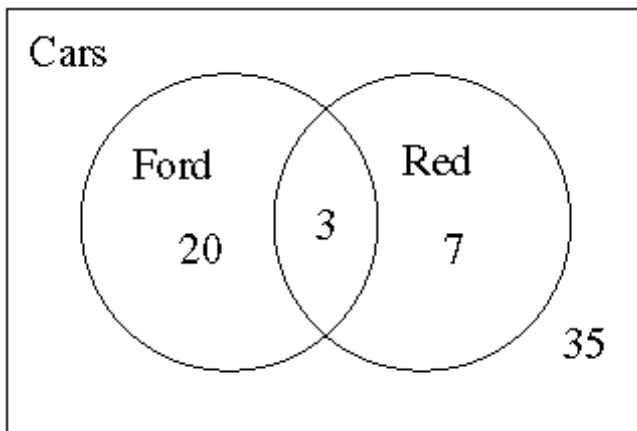
A) 17   B) 30   C) 23   D) 20

Answer: C

Determine whether the statement is a proposition.

90) Not all flowers are roses.
   A) Not a proposition   B) Proposition

Answer: B

22

Draw a Venn diagram to represent the given information.

91) Patients in a (hypothetical) hospital on a single day were taking antibiotics (A), blood pressure medication (BP), and pain medication (P) in the following numbers:
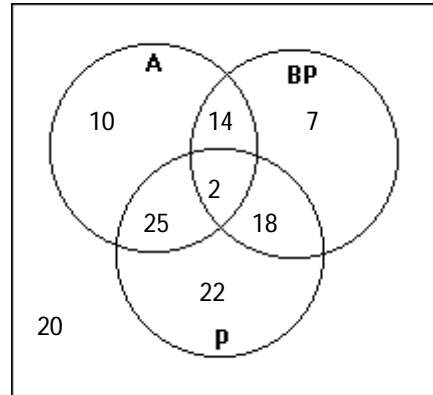
A only	10	A and BP only	14
BP only	7	A and P only	25
P only	22	BP and P only	18
None	2	All three	20

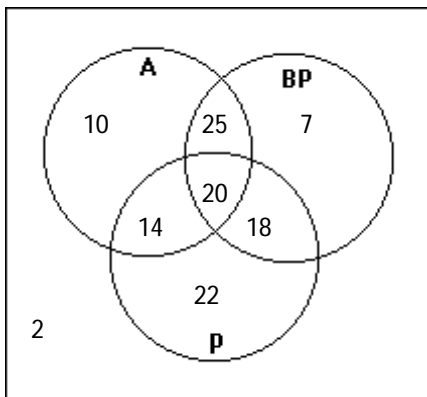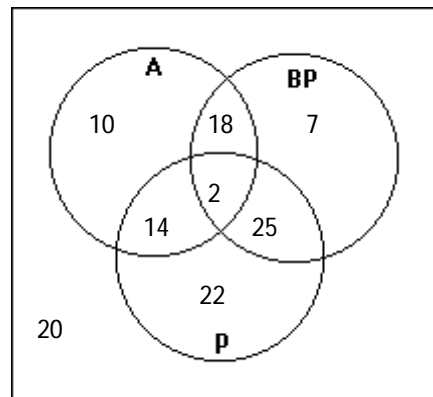Draw a three-circle Venn diagram that summarizes the results in the table.

A)
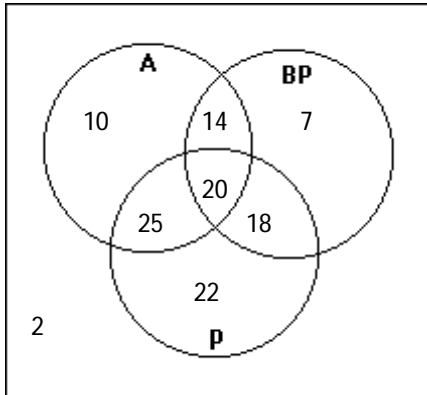
B)

C)

D)

Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Decide whether the statement makes sense. Explain your reasoning.

92) Your argument has no fallacies, so your conclusion must be true.

Answer: Does not make sense. By using false assumptions for premises, it is possible to create a solid argument even for a conclusion that is clearly false. (Explanations will vary.)

23

Provide an appropriate response.
93) IRS guidelines state that a married person under 65 years of age who can be claimed as a dependent on another person's tax return must file a return if
(i) unearned income was over $750; or
(ii) earned income was over $3925; or
(iii) total of earned and unearned income was at least $5 and your spouse files a separate return and itemizes deductions; or
(iv) total of earned and unearned income was more than the greater of
a) $750; or
b) earned income (up to $3675) plus $250.

Julia is 45 years old and can be claimed as a dependent by her father. She had earned income of $3800 and unearned income of $200. Julia's husband Bret files a separate return but does not itemize deductions. Must Julia file a return? Explain.

Answer: Yes, Julia must file a return. She is a married person under 65 years of age who can be claimed as a dependent on another person's tax return. As such, she must file a return if any of (i)-(iv) apply.
(i) does not apply since $200 < $750;
(ii) does not apply because $3800 < $3925;
(iii) does not apply because although her spouse (Bret) files a separate return, he does not itemize;
(iv) does apply. Part (b) is a little confusing. It says to start with earned income, but only earned income up to $3675. Since $3800 > $3675, we start with $3675. Then we add $250 to get $3925. The greater of (a) $750 or (b) $3925 is clearly $3925. The total of Julia's earned and unearned income is $4000 ($3800 + $200). Since $4000 > $3925, (iv) applies and Julia must file a return. (Explanations will vary.)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.
94) The following Venn diagram describes the optional features ordered by new telephone customers in a certain region. Use it to determine how many customers ordered call waiting.
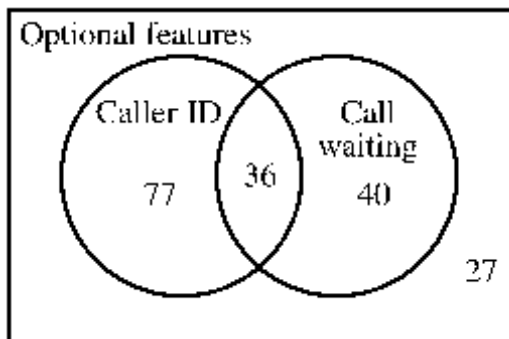
A) 40   B) 36   C) 76   D) 77
Answer: C

Decide whether the argument is inductive or deductive.
95) For any positive number p, $|-p| = p$. Therefore, $|-12| = 12$
   A) Deductive   B) Inductive
Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Draw a Venn diagram for the given sets. In words, explain why you drew one set as a subset of the other, disjoint sets, or overlapping sets.

    96) beverages and soft drinks

        Answer:

        The set "soft drinks" is a subset of the set "beverages." All soft drinks are beverages, but some beverages (e.g., water) are not soft drinks.

Create a simple three-line argument for the given form. Choose your example so that it illustrates clearly whether or not the argument is valid.

    97) Denying the hypothesis

        Answer: Answers will vary. The structure of the argument should be as follows:
            Premise: If p, then q.
            Premise: p is not true.
            Conclusion: q is not true.

            The argument is invalid.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Write the converse, inverse, or contrapositive off the proposition, as indicated.

    98) If the alarm beeps every thirty seconds, then you have to replace the battery. (converse)
        A) If the alarm does not beep every thirty seconds, then you do not have to replace the battery.
        B) If you do not have to replace the battery, then the alarm does not beep every thirty seconds.
        C) If you have to replace the battery, then the alarm does not beep every thirty seconds.
        D) If you have to replace the battery, then the alarm beeps every thirty seconds.

        Answer: D

Rephrase the statement as a conditional proposition with the form "if p, then q."

    99) Cats chase mice.
        A) If a cat is chasing it, then it is a mouse.   B) If cats chase, then they chase mice.
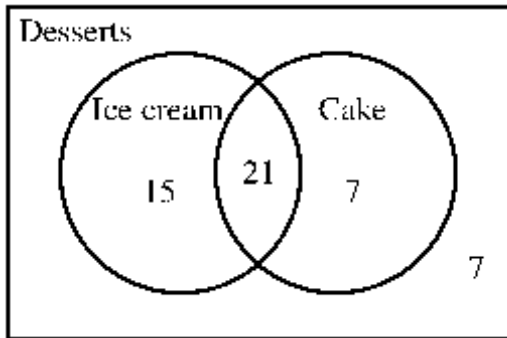   C) If it is a cat, then it chases mice.   D) If cats, then mice.

        Answer: C

Solve the problem.
100) The following Venn diagram describes the desserts people ordered at a party. Use it to determine how many people ordered cake.

A) 43   B) 21   C) 7   D) 28

Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

The statement contains a double or multiple negation. Analyze the statement, explaining what it means.
101) "As your Senator, I cannot in good conscience oppose those who are against deregulation."

    Answer: Answers may vary. One possibility: There are four negations in that statement: cannot, oppose, those who are against, and deregulation. A quadruple negation (not not not not p) has the same truth value as the original proposition p. In short, the Senator is for regulation of the area in question.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Decide whether the argument is inductive or deductive.
102) 31 + 19 = 50, 13 + 47 = 60, 5 + 37 = 42. Therefore, the sum of two prime numbers is even.
    A) Deductive   B) Inductive

Answer: B

103) Every coach must know his sport well. Steve Spurrier is a football coach, so Steve Spurrier knows football well.
    A) Inductive   B) Deductive

Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

The argument contains an example of the fallacy named in parentheses. Explain how the fallacy occurs in the argument.
104) (Diversion) We've just remodeled the restaurant, so our food is delicious!

    Answer: Answers may vary. Possible answer: The conclusion of this argument (our food is delicious) is not related to the premise (We've just remodeled the restaurant). This argument represents the fallacy of diversion because it attempts to divert attention from the real issue (the taste of the food) by focusing on another issue (the remodeling of the restaurant). The issue to which attention is diverted is sometimes called a red herring.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

The argument given or described involves some kind of fallacy. Identify the fallacy.
105) Each of my brother's three dogs has fleas. Therefore, all dogs have fleas.
A) Hasty generalization
B) Straw man
C) False cause
D) Circular reasoning

Answer: A

Two statements are listed in which p, q, and r represent propositions. Are the two statements logically equivalent?
106) not (p and q); (not p) or q
A) Yes
B) No

Answer: B

Write the converse, inverse, or contrapositive off the proposition, as indicated.
107) If you received a refund of over $1000, then you cannot make a claim. (inverse)
A) If you did not receive a refund of over $1000, then you can make a claim.
B) If you can make a claim, then you did not receive a refund of over $1000.
C) If you cannot make a claim, then you did not receive a refund of over $1000.
D) If you can make a claim, then you received a refund of over $1000.

Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

A set of propositions is listed. Draw a Venn diagram that represents all the information in the propositions and use it (and no other assumptions) to answer the question. Explain your reasoning.
108) All cars have wheels. All trucks have wheels. Some toys have wheels. No grandmothers have wheels.
Question: Could a car be both a truck and a toy?

Answer: Answers may vary. One possibility:
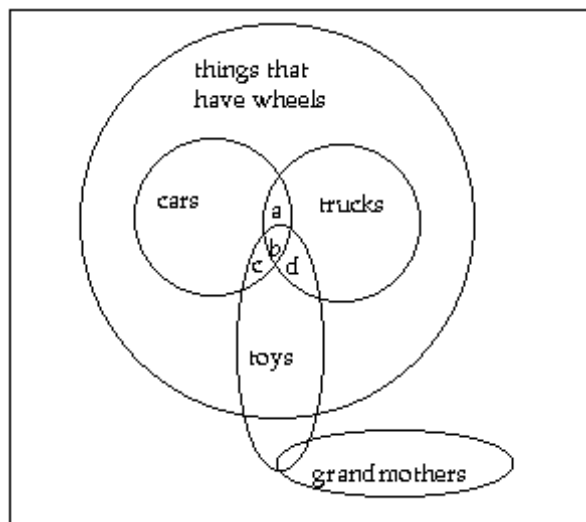
Yes, a car could be both a truck and a toy. We know from the first two propositions that the set "cars" and the set "trucks" are subsets of the set "things that have wheels," but we do not know whether the two subsets are disjoint or overlapping or whether one is a subset of the other. We know from the third proposition that the set "toys" overlaps the set "things that have wheels," but we do not know whether it also overlaps either or both of the sets "cars" and "trucks." Depending on whether or not "cars," "trucks," and "toys" overlap; the regions a, b, c, and d may or may not have any elements. Since region b might have elements, a car could be both a truck and a toy.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Choose the first set in the list natural numbers, whole numbers, integers, rational numbers, and real numbers that describes the following number.

109) 3,645

    A) Rational numbers   B) Natural numbers   C) Integers   D) Whole numbers

    Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

The statement contains a double or multiple negation. Analyze the statement, explaining what it means.

110) The House of Representatives voted to override the veto of the communications bill.

    Answer: Answers may vary. One possibility: This is a double negation. The veto of the bill (presumably by the President) is the first negation. The overriding of the veto is the second negation. The two cancel each other out, and the result is that the communications bill is passed. In general, a double negation (not not p) has the same same truth value as the original proposition p.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

The argument given or described involves some kind of fallacy. Identify the fallacy.

111) If Proposition Q fails, your children won't have good schools.

    A) Hasty generalization   B) Appeal to ignorance
    C) Diversion (red herring)   D) Appeal to emotion

    Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

A categorical proposition is given. If it is not already in standard form, rephrase it. State the subject and predicate sets, and draw a Venn diagram for the proposition. Label all regions of the diagram clearly.
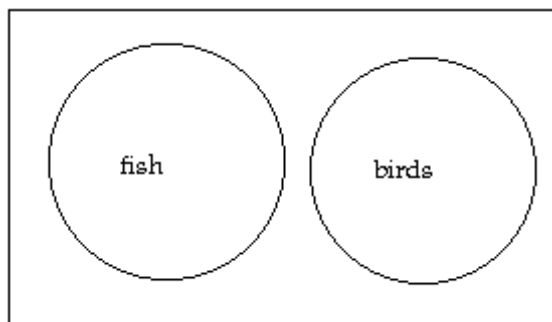
112) No positive numbers are negative numbers.

    Answer: The subject set is "positive numbers" and the predicate set is "negative numbers."
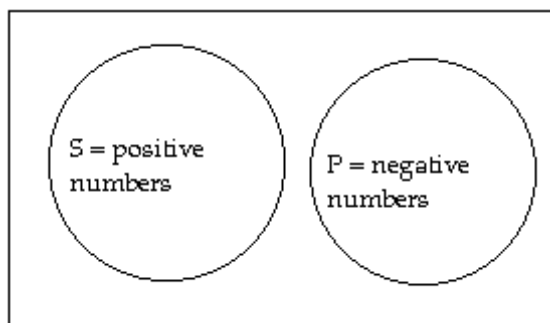
Draw a Venn diagram for the given sets. In words, explain why you drew one set as a subset of the other, disjoint sets, or overlapping sets.

113) fish and birds

Answer:

The set "fish" is disjoint from the set "birds" because the two sets have no members in common. A fish cannot be a bird, and a bird cannot be a fish.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

114) The following Venn diagram describes the types of cookies in a bakery. Use it to determine how many chocolate chip cookies do not also have walnuts.
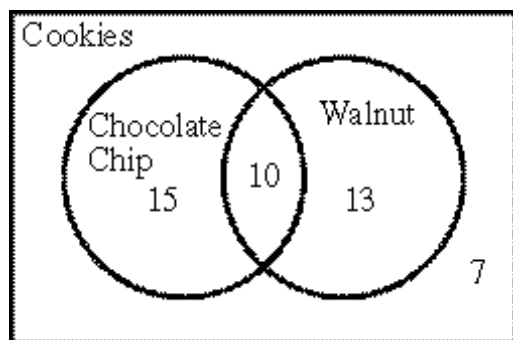
A) 15   B) 10   C) 32   D) 25

Answer: A

Make a truth table for the given statement. The letters p, q, r, s represent propositions.

115) r and not s

A)

r	s	r and not s
T	T	T
T	F	F
F	T	F
F	F	F

B)

r	s	r and not s
T	T	F
T	F	T
F	T	F
F	F	F

C)

r	s	p and not s
T	T	F
T	F	T
F	T	F
F	F	F

D)

r	s	r and not s
T	T	T
T	F	T
F	T	F
F	F	T

Answer: B

Choose the first set in the list natural numbers, whole numbers, integers, rational numbers, and real numbers that describes the following number.

116) 16

A) Real numbers   B) Integers   C) Whole numbers   D) Natural numbers

Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

The statement connects two individual propositions with the word and. State whether the entire statement is true or false, and explain why.

117) The sun is bigger than the moon and the sun rotates around the earth.

Answer: False. Is is true that the sun is bigger than the moon, but it is not true that the sun rotates around the earth. (The earth rotates around the sun.) Since one of the individual propositions if false, the conjunction is false.

Decide whether the statement makes sense. Explain your reasoning.

118) Wayne's bank charges a $1 service charge for every transaction. To save money, he withdraws $100 cash every other week instead of withdrawing $50 every week.

Answer: Makes sense. By taking out the same amount of money but reducing the number of withdrawals, he saves money on service charges ($0.50 per week). What would make even more sense would be to find a bank that doesn't charge a fee for every transaction. (Explanations will vary.)

Draw a Venn diagram for the given sets. In words, explain why you drew one set as a subset of the other, disjoint sets, or overlapping sets.

119) even numbers and odd numbers

Answer:
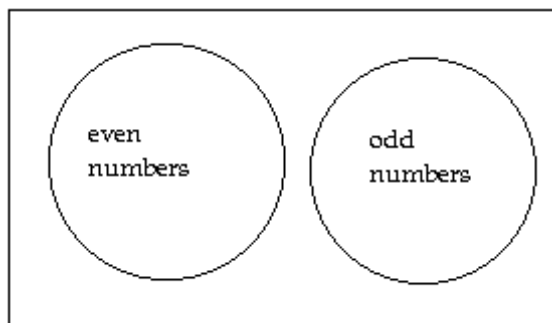
The set "even numbers" is disjoint from the set "odd numbers" because the two sets have no members in common. An even number cannot be odd, and an odd number cannot be even.

Identify the type of argument and determine its validity with a Venn diagram.

    120) Premise: If you try hard, then you will succeed.
        Premise: You did not try hard.
        Conclusion: You will not succeed.

        Answer:
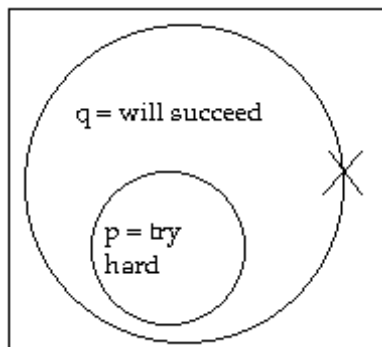
The type of argument is called Denying the Hypothesis. We have p = you try hard and q = you will succeed. The second premise asserts that p is false for you, which we show by putting an X outside the p circle. However, we do not know whether the X should also be outside the q circle, because the premise says nothing about whether you succeeded. Thus, we put the X on the border of the q circle. The Venn diagram shows that the premises do not lead necessarily to the conclusion, so the argument is invalid. It is possible that, despite your not trying hard, you might still succeed.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Choose the first set in the list natural numbers, whole numbers, integers, rational numbers, and real numbers that describes the following number.

    121) -64

        A) Whole numbers   B) Integers   C) Real numbers   D) Natural numbers

        Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Create a simple three-line argument for the given form. Choose your example so that it illustrates clearly whether or not the argument is valid.

    122) Denying the conclusion

        Answer: Answers will vary. The structure of the argument should be as follows:
                Premise: If p, then q.
                Premise: q is not true.
                Conclusion: p is not true.

                The argument is valid.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Write the negation of the proposition.

    123) No fifth graders play soccer.
        A) No fifth grader does not play soccer.   B) All fifth graders play soccer.
        C) At least one fifth grader plays soccer.   D) Not all fifth graders play soccer.

        Answer: C

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

A seemingly simple argument is given. Identify at least two hidden assumptions.
124) Jeremy needs a new bike, because the new models have a safer braking system.

Answer: Answers may vary. One possibility:
Safer bikes are better bikes.
Buying a new braking system for Jeremy's old bike is not a reasonable option.

Provide an appropriate response.
125) IRS guidelines state that a married person under 65 years of age who can be claimed as a dependent on another person's tax return must file a return if
(i) unearned income was over $750; or
(ii) earned income was over $3925; or
(iii) total of earned and unearned income was at least $5 and your spouse files a separate return and itemizes deductions; or
(iv) total of earned and unearned income was more than the greater of
a) $750; or
b) earned income (up to $3675) plus $250.

Kevin is 25 years old and can be claimed as a dependent by his mother. He had earned income of $3500 and unearned income of $700. Kevin's wife Linda files a separate return but does not itemize deductions. Must Kevin file a return? Explain.

Answer: Yes, Kevin must file a return. He is a married person under 65 years of age who can be claimed as a dependent on another person's tax return. As such, he must file a return if any of (i)-(iv) apply.
(i) does not apply since $700 < $750;
(ii) does not apply because $3500 < $3925;
(iii) does not apply because although his spouse (Linda) files a separate return, she does not itemize;
(iv) does apply. The total of earned and unearned income ($3500 + $700 = $4200) is greater than both (a) $750 and (b) earned income (up to $3675) plus $250 ($3500 + $250 = $3750). Thus, Kevin must file a return. (Explanations will vary.)

A categorical proposition is given. If it is not already in standard form, rephrase it. State the subject and predicate sets, and draw a Venn diagram for the proposition. Label all regions of the diagram clearly.
126) Movies are entertaining.

Answer: In standard form: All movies are things that are entertaining.
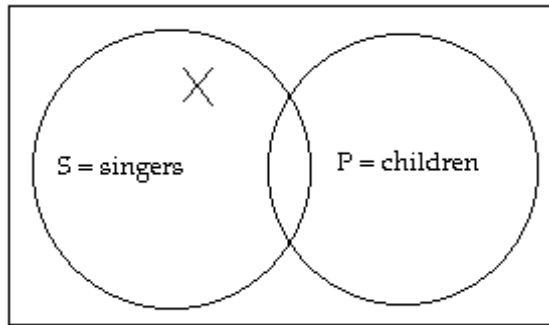The subject set is "movies" and the predicate set is "things that are entertaining."
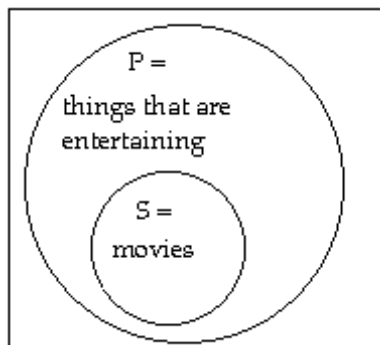
127) Some singers are not children.

Answer: The subject set is "singers" and the predicate set is "children."

The X indicates that the non-overlapping region of the "singers" circle has at least one member. No claim is made about whether other regions also have members.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

The argument given or described involves some kind of fallacy. Identify the fallacy.
128) One candidate favors eliminating affirmative action programs. The other candidate states: My opponent doesn't think there's anything wrong with discrimination."
A) Limited choice
B) Hasty generalization
C) Personal attack (ad hominem)
D) Straw man

Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

A seemingly simple argument is given. Identify at least two hidden assumptions.
129) Cardiovascular exercise is important, because to be healthy you need a strong heart.

Answer: Answers may vary. One possibility:
Cardiovascular exercise leads to a strong heart.
Being healthy is important.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.
130) The following Venn diagram describes the optional features ordered by new telephone customers in a certain region. Use it to determine how many customers did not order caller ID.
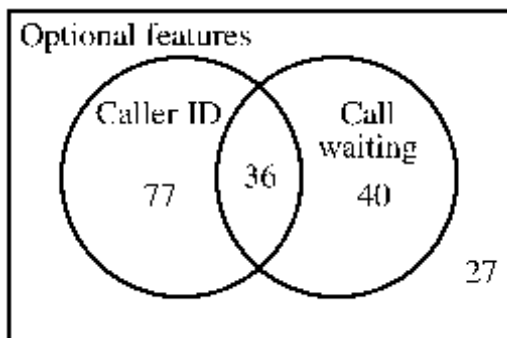
A) 67   B) 76   C) 103   D) 77

Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

A seemingly simple argument is given. Identify at least two hidden assumptions.
131) I should not go outside, because it is raining.

Answer: Answers may vary. One possibility:
I do not want to get wet.
It is not raining inside; that is, the roof is keeping the rain outside.

Analyze the situation and explain how you would make a decision.
132) The costs per day of driving to work are $5 for gas, $10 for parking, and $1 for wear-and-tear on the car. Taking the train to work costs $6.50 each way, plus $1.50 per day to park at the train station. Should you drive or take the train?

Answer: Answers may vary. One possibility: Since driving costs $16 ($5 + $10 + $1 = $16) per day and taking the train costs $14.50 ($6.50 × 2 + $1.50 = $14.50) per day, it appears that taking the train is a better option. However, you should also consider other factors. If you have a spouse who might need the car during the day, then that's another reason to take the train (that would also save you the $1.50 parking fee). If you take the train, you might be able to read the newspaper or do work on the way to work. However, if the train tends to be crowded and you prefer being alone, then it might be worth the extra $1.50 per day to drive.

Decide whether the statement makes sense. Explain your reasoning.
133) The premises are true and the conclusion is true, so the argument must be valid.

Answer: Does not make sense. For an argument to be valid, its conclusion must follow necessarily from its premises. Just because the premises and the conclusion are true does not mean the conclusion follows necessarily from the premises. For example, consider the following argument:
Premise: Dogs bark.
Premise: Cats meow.
Conclusion: Pigs oink.
The premises and the conclusion are all true, but the conclusion has nothing to do with the premises. (Explanations will vary.)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the statement is true or false.
134) If Florida is in the United States, then all squares are rectangles.
    A) True   B) False
    Answer: A

Rephrase the statement as a conditional proposition with the form "if p, then q."
135) Being in California is sufficient for being in Los Angeles.
        A) If you are in California, then you are in Los Angeles.
        B) If you are in Los Angeles, then you are in California.
        C) If you are in Los Angeles, then you might be in California.
        D) If you are in California, then you are not in Los Angeles.
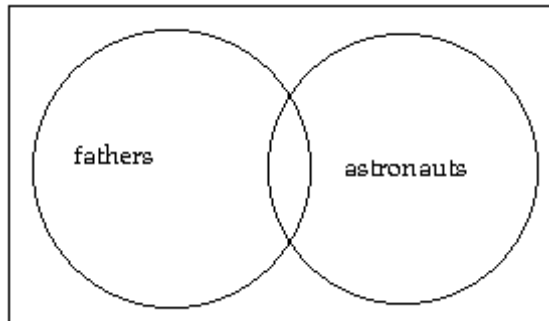
    Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Draw a Venn diagram for the given sets. In words, explain why you drew one set as a subset of the other, disjoint sets, or overlapping sets.

136) astronauts and fathers

Answer:

The sets are overlapping. It is possible for a person to be both an astronaut and a father, but not all astronauts are fathers and certainly not all fathers are astronauts.

The statement connects two individual propositions with the word and. State whether the entire statement is true or false, and explain why.

137) Springfield is the capital of Illinois and Chicago is the capital of Illinois.

Answer: False. Springfield is the capital of Illinois, but Chicago is not the capital of Illinois. (Even if you don't know the capital of Illinois, you can determine that at least one of the propositions is false.) Since one of the individual propositions is false, the conjunction is false.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Make a truth table for the given statement. The letters p, q, r, s represent propositions.

138) if q, then not r

A)

q	r	if q, then not r
T	T	T
T	F	F
F	T	F
F	F	F

B)

q	r	if q, then not r
T	T	F
T	F	T
F	T	T
F	F	T

C)

q	r	if q, then not r
T	T	T
T	F	F
F	T	T
F	F	T

D)

q	r	if q, then not r
T	T	F
T	F	T
F	T	F
F	F	F

Answer: B

Determine whether the statement is a proposition.

139) $5 + 7 = 13$

    A) Proposition   B) Not a proposition

Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

A seemingly simple argument is given. Identify at least two hidden assumptions.

140) All bills should be paid on time because a bad credit report will make it difficult to get a loan.

Answer: Answers may vary. One possibility:
Paying bills late will result in bad credit.
It is important to be able to get a loan.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

The argument given or described involves some kind of fallacy. Identify the fallacy.

141) When confronted with questions from the press about alleged scandals, a congressman replies that the allegations against him should be ignored since his accuser is part of a vast right-wing conspiracy.
A) Personal attack (ad hominem)   B) Limited choice
C) Circular reasoning   D) Appeal to popularity

Answer: A

Write the negation of the proposition.

142) Susie lives in a green house.
A) Susie lives in a blue house.   B) Susie does not live in a green house.
C) Billy lives in a green house.   D) Susie does not live in a house that is not green.

Answer: B

Determine whether the statement is true or false.

143) If horses have six legs, then Benjamin Franklin was the first president of the United States.
A) True   B) False

Answer: A

Two statements are listed in which p, q, and r represent propositions. Are the two statements logically equivalent?

144) not (p or q); (not p)and (not q)
A) Yes   B) No

Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

A seemingly simple argument is given. Identify at least two hidden assumptions.

145) The campfire should be extinguished before we go fishing because the park ranger can cite us for illegal activities.

Answer: Answers may vary. One possibility:
An unattended campfire is illegal.
Getting a citation from the park ranger would be a bad thing.

Analyze the situation and explain how you would make a decision.

146) Betty has to go to New Orleans on business. If she flies there and back on the same day her round trip airfare will cost $700. If she stays overnight, her round trip airfare will cost $400, her hotel will cost $100, and three extra meals will cost $75.

Which is the better option?

Answer: Answers may vary. One possibility: It will cost her $575 to stay overnight ($400 + $100 + $75), and it will cost her $700 to fly back the same day. It appears that staying overnight is the better option, since it will save her $125. However, she could consider other factors before making a decision. Will staying overnight force her to miss all or part of a day of work? If so, that could cost her more than $125. Is it important to her to be home with her family? If so, the potential $125 savings may be illusory. Then again, she might enjoy having a night to herself and ordering room service.

Decide whether the statement makes sense. Explain your reasoning.

147) I did not convince my friend that I was right, so I must not have argued logically.

Answer: Does not make sense. Arguing logically may not change the other person's position, but it can help the other person understand you, and vice versa. (Explanations will vary.)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

The argument given or described involves some kind of fallacy. Identify the fallacy.

148) You should brush your teeth every day because brushing your teeth is very important.
   A) Hasty generalization   B) False cause
   C) Diversion (red herring)   D) Circular reasoning

   Answer: D

Write the negation of the proposition.

149) Not all people like football.
   A) Some people like football.   B) Some people do not like football.
   C) All people do not like football.   D) All people like football.

   Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Decide whether the statement makes sense. Explain your reasoning.

150) If you have $5, then you will buy a hot dog; and, contrapositively, if you don't have $5, then you won't buy a hot dog. (Hint: focus on whether the word "contrapositively" is used correctly.)

Answer: Does not make sense. The contrapositive of "If p, then q" is "If not q, then not p." The contrapositive of "If you have $5, then you will buy a hot dog" is "If you will not buy a hot dog, then you don't have $5." What is actually given is the inverse. (Explanations will vary.)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.
151) The following Venn diagram describes the cars on a used car lot. Use it to determine how many cars on the lot are not red.
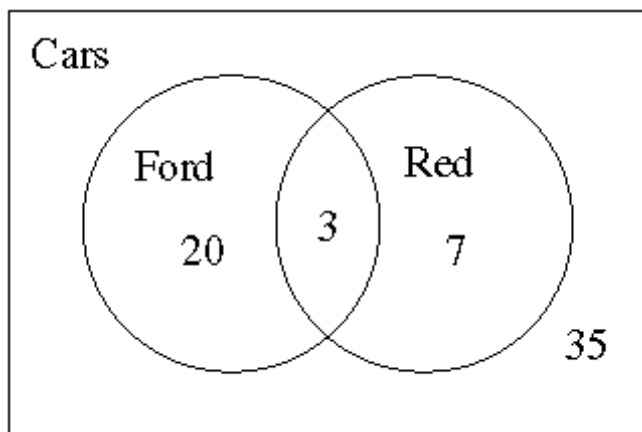
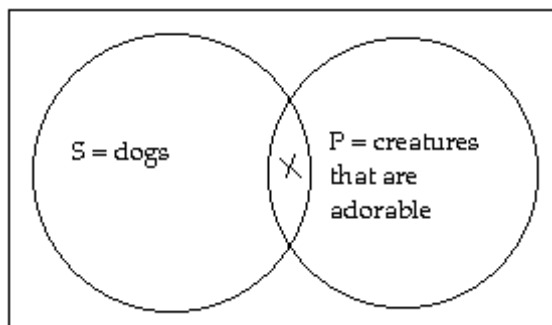A) 35   B) 38   C) 58   D) 55

Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

A categorical proposition is given. If it is not already in standard form, rephrase it. State the subject and predicate sets, and draw a Venn diagram for the proposition. Label all regions of the diagram clearly.
152) Some dogs are adorable.

     Answer: In standard form: Some dogs are creatures that are adorable.
                The subject set is "dogs" and the predicate set is "creatures that are adorable."

                The X indicates that the overlapping region has at least one member. No claim is made about whether other regions also have members.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Choose the first set in the list natural numbers, whole numbers, integers, rational numbers, and real numbers that describes the following number.
153) -4π
     A) Integers   B) Whole numbers   C) Rational numbers   D) Real numbers
     Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Determine the truth of the premises, discuss the strength of the argument, and assess the truth of the conclusion.

154) Premise: Baseball, football, basketball, golf, hockey, and tennis are all played with a ball.
Conclusion: All sports are played with a ball.

Answer: Answers may vary. Possible answer: The premise is false. Most of the sports listed are played with a ball, but hockey is played with a puck. The argument is weak, and the conclusion is false. Many sports, in addition to hockey, do not involve a ball, including wrestling, swimming, and skiing.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Evaluate the validity of the chain of conditionals.

155) Premise: If the moon is made of cheese, then what goes up must come down.
Premise: If what goes up must come down, then most Americans like apple pie.
Conclusion: If the moon is made of cheese, then most Americans like apple pie.
   A) Invalid   B) Valid

Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

A categorical proposition is given. If it is not already in standard form, rephrase it. State the subject and predicate sets, and draw a Venn diagram for the proposition. Label all regions of the diagram clearly.

156) All horses are animals.

Answer: The subject set is "horses" and the predicate set is "animals."
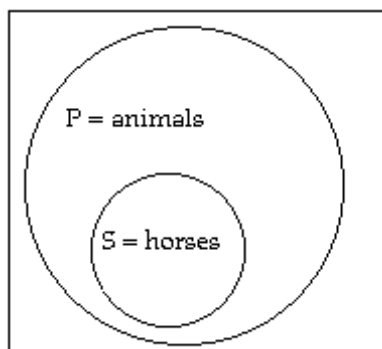
Draw a Venn diagram to determine whether the argument is valid.

157) Premise: All lawyers wear suits.
Premise: Jack wears a suit.
Conclusion: Jack is a lawyer.

Answer:
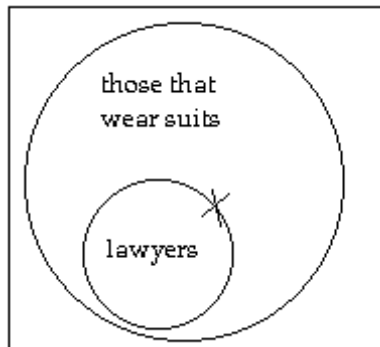
The X represents Jack. We do not have enough information to know whether the X should be inside or outside the "lawyers" circle. Therefore, the conclusion does not follow necessarily from the premises, and the argument is invalid.

Provide an appropriate response.

158) The members of a union are on strike. They are satisfied with their hourly wage rate and benefits, but they want their overtime wage rate to be increased by 15% in their next contract. The head of management makes the following statement to the head of the union: "If you end the strike today and sign the contract, we will meet your demand and increase the overtime wage rate by 15%." Should the union head accept the offer? Explain.

Answer: Answers may vary. One possibility: The union head should ask for more information. Even though management has apparently agreed to the demand for a 15% increase in the overtime wage rate, it is not clear that the overall deal is a good one. It is entirely possible that management has lowered the hourly wage rate, reduced the benefits, or made other changes to the contract to the detriment of the members of the union. Before making any promises, before giving up leverage by ending the strike, and certainly before signing anything; these issues must be clarified.

The statement connects two individual propositions with the word or. State whether the entire statement is true or false, and explain why.

159) $9 + 5 = 14$ or $6 \times 7 = 42$

Answer: True. Both individual propositions are true. The disjunction is true if either or both propositions are true.

Decide whether the statement makes sense. Explain your reasoning.

160) I know more of the names of the common fallacies in arguments than my father, so I can recognize fallacies better than he can.

Answer: Does not make sense. Learning the fancy names for the fallacies is far less important than learning to recognize the faulty reasoning. (Explanations will vary.)

Analyze the situation and explain how you would make a decision.

161) You are flying out on Monday morning and returning home Tuesday night. You need to decide how to get to and from your home airport. Driving each way costs $2 in gas, and long-term parking costs $10 per full or partial day. If you take taxis, it will cost $11 each way. Which option is better?

Answer: Answers may vary. One possibility: Taking taxis will cost you $22 (2 trips × $11/trip), while driving will cost you $24 (2 days × $10/day + 2 trips × $2/trip). Driving appears to be a better option. However, before you make your decision, you should consider hidden costs and benefits. What if your trip is extended or your return flight is delayed? Each additional day of long-term parking will cost you $10. In addition, there is the wear-and-tear on the car and the fact that your car would be left in a public lot, where the risk of theft or vandalism might be greater. Those factors would make taking taxis the better option. On the other hand, if you are on a tight schedule, you might not want to rely on a taxi to pick you up on time.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Decide whether the argument is inductive or deductive.

162) Fresh fruit is expensive in winter. This is January, so these fresh strawberries will be expensive.

A) Inductive   B) Deductive

Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

163) You mention to an acquaintance that you wish to buy a Rolex watch, but the model you're interested in is too expensive for your budget. He says that his cousin sells watches, and he'll see if he can get you a deal. Sure enough, his cousin offers you the same watch for 50% of the price. Does this sound like a deal worth taking?

Answer: Answers may vary. One possibility: No. There is too much missing information and too many red flags. Why is the cousin of an acquaintance willing to give you such a good deal? Perhaps he's just a generous guy, but there are other possibilities to consider. He claims it's "the same watch," but how do you know it's not counterfeit? Even if it's authentic, how do you know it's not used or broken? Even if it's in mint condition, how do you know it's not stolen? In trying to save money, you might cost yourself money or even end up in jail.
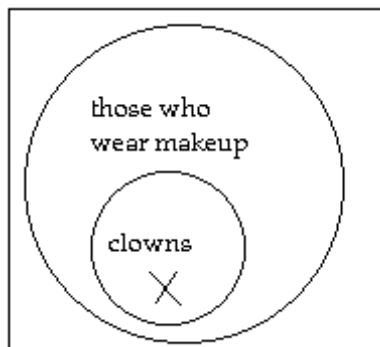
Draw a Venn diagram to determine whether the argument is valid.

164) Premise: All clowns wear makeup.
Premise: Bozo is a clown.
Conclusion: Bozo wears makeup.

Answer:

The X represents Bozo. The conclusion follows necessarily from the premises, and the argument is valid.

Decide whether the statement makes sense. Explain your reasoning.

165) Your conditional deductive argument is valid. Therefore, it must be an example of "Affirming the Hypothesis."

Answer: Does not make sense. There are four basic structures for conditional arguments. Two of them, "Affirming the Conclusion" and "Denying the Hypothesis," are invalid. The other two, "Affirming the Hypothesis" and "Denying the Conclusion," are valid. Since it might be an example of ""Denying the Conclusion," it is not true that it must be an example of "Affirming the Hypothesis." (Explanations will vary.)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Write the negation of the proposition.

166) She earns more than me.
   A) She does not earn more than me.   B) She earns less than me.
   C) She does not earn less than me.   D) She earns the same as me.

Answer: A

State whether or is being used in the exclusive or inclusive sense in the given statement.

167) The insurance policy will not cover misuse or acts of God.
   A) Inclusive   B) Exclusive

Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

The statement connects two individual propositions with the word or. State whether the entire statement is true or false, and explain why.

168) There are 25 letters in the English alphabet or the letter c is a vowel.

Answer: False. Since there are 26 letters in the English alphabet, the first proposition is false. Since the letter c is not a vowel but a consonant, the second proposition is false. Since both propositions are false, the disjunction is false.

Create a simple three-line argument for the given form. Choose your example so that it illustrates clearly whether or not the argument is valid.

169) Affirming the conclusion

Answer: Answers will vary. The structure of the argument should be as follows:
        Premise: If p, then q.
        Premise: q is true.
        Conclusion: p is true.

        The argument is invalid.

Describe how the sentence is ambiguous.

170) Two stores with more than 1000 pieces of merchandise will have grand openings at the mall this weekend.

Answer: It is unclear whether the two stores combined have more than 1000 pieces of merchandise or whether each store itself has more than 1000 pieces of merchandise.

The statement connects two individual propositions with the word or. State whether the entire statement is true or false, and explain why.

171) Cats reads books or dogs bark.

Answer: True. Although cats do not read books, dogs do bark. The disjunction is false only if both individual propositions are false.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Write the negation of the proposition.
172) Everyone is asleep.
   A) Everyone is awake.   B) Not everyone is asleep.
   C) Nobody is asleep.   D) Nobody is awake.
      Answer: B

Two statements are listed in which p, q, and r represent propositions. Are the two statements logically equivalent?
173) (p or q) or r; p or (q or r)
   A) No   B) Yes
      Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Analyze the situation and explain how you would make a decision.
174) You want a new car but plan to use it for only 2 years. The cost of leasing is $2,000 down and $300 per month.
     The cost of buying is $20,000, and you can expect to sell it in two years for approximately $12,000. Which is the
     better option?
     Answer: Answers may vary. One possibility: If you lease the car for two years, it will cost $9200
             ($2000 + 24 months × $300/month). If you buy it, it will cost $8000 ($20,000 – $12,000). At first glance, it
             appears that buying is a better option. However, you need to consider other factors before you make your
             decision. How do you know that you will be able to sell the used car for $12,000 in two years? If your
             estimate is off by only 10% ($1200), then leasing will already be as cost-effective. In addition, you need to
             consider how the time value of money makes buying a less attractive option. The higher the interest rate,
             the more it will implicitly cost to buy the car (whether you borrow and pay interest expense or pay cash
             and forego interest income). Moreover, you should read all the fine print of the lease agreement. Are you
             locked into the lease for two years? Can you keep it longer if you wish? Are there any additional costs
             due when you return the car?

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use braces to write the members of the set, or state that the set has no members.
175) The integers between 3 and 7 (not inclusive)
   A) {3, 4, 5, 6, 7}   B) {3, 4, 5, 6}   C) {4, 5, 6, 7}   D) {4, 5, 6}
      Answer: D

The argument given or described involves some kind of fallacy. Identify the fallacy.
176) We must limit immigration to the United States in order to sustain the prosperous economy. A strong economy
     is vital to the health and wealth of the American people and the future of our children.
   A) Appeal to force   B) False cause
   C) Diversion (red herring)   D) Straw man
      Answer: C

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Draw a Venn diagram for the given sets. In words, explain why you drew one set as a subset of the other, disjoint sets, or overlapping sets.

177) doctors and poets

Answer:
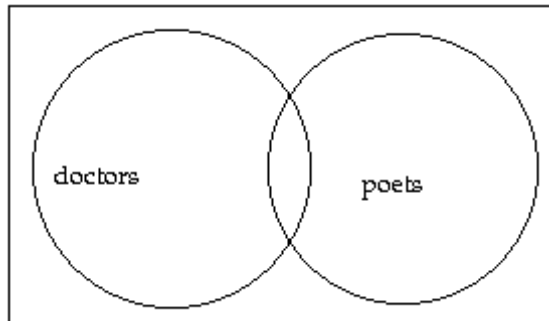
The sets are overlapping. It is possible for a person to be both a doctor and a poet, but a doctor is not necessarily a poet and a poet is not necessarily a doctor.

The statement connects two individual propositions with the word and. State whether the entire statement is true or false, and explain why.

178) $6 + 7 = 13$ and $9 \times 4 = 45$

Answer: False. The proposition $6 + 7 = 13$ is true, but the proposition $9 \times 4 = 45$ is false. Since one of the individual propositions is false, the conjunction is false.

The argument contains an example of the fallacy named in parentheses. Explain how the fallacy occurs in the argument.

179) (Hasty Generalization) Isabelle had vegetarian food for lunch every day last week, so she must be a vegetarian.

Answer: Answers may vary. Possible answer: The premise of this argument cites one case in which Isabelle ate vegetarian food. But one case is not enough to establish a pattern, let alone to conclude that Isabelle always eats vegetarian food.

Identify the type of argument and determine its validity with a Venn diagram.

180) Premise: If you cut me, I bleed.
Premise: I do not bleed.
Conclusion: You did not cut me.

Answer:
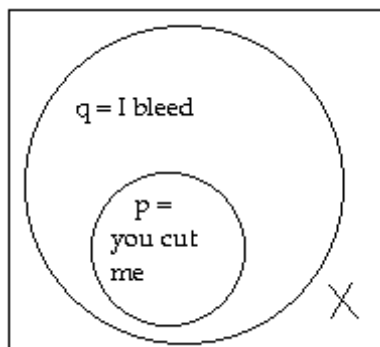
The type of argument is called Denying the Conclusion. We have p = you cut me and q = I bleed. The second premise asserts that q is false for me, which we show by putting an X outside the q circle. Since the p circle is inside the q circle, the X is outside the p circle, too. The Venn diagram shows that the premises lead necessarily to the conclusion, so the argument is valid.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Rephrase the statement as a conditional proposition with the form "if p, then q."
181) All chocolate is good.
    A) If it isn't good, then it's chocolate.   B) If it isn't chocolate, then it isn't good.
    C) If it's good, then it's chocolate.   D) If it's chocolate, then it's good.
    Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Decide whether the statement makes sense. Explain your reasoning.
182) The propositions "I am hungry" and "I am not hungry" are both true, since sometimes I am hungry and sometimes I am not hungry.

    Answer: Does not make sense. The second proposition is the negation of the first proposition. If a proposition is true, then its negation must be false, and vice versa. Thus, the two propositions cannot both be true. But, you argue, I was hungry at 7:00 this morning, but then I ate breakfast and I was not hungry at 8:00. The explanation is that "I was hungry at 7:00 this morning" and "I was hungry at 8:00 this morning" are two different propositions. The first one is true and its negation is false, while the second one is false and its negation is true. (Explanations will vary.)

A seemingly simple argument is given. Identify at least two hidden assumptions.
183) It is important to visit the dentist every 6 months to insure healthy teeth and gums.

    Answer: Answers may vary. One possibility:
    Healthy teeth are important.
    Healthy gums are important.

Provide an appropriate response.
184) Consider the following clause in a rental lease:
"Lessee may terminate this lease at the end of the initial term by providing Lessor with at least sixty (60) days prior written notice, to commence upon the first day of the month following the month in which said notice is delivered or immediately if delivered on the first day of any month."
If the initial term of the lease ends on March 31 and the Lessee provides the Lessor written notice on April 1, as of what date can the lease be terminated? What if he provides notice on April 2?

    Answer: Answers may vary. One possibility: If written notice is provided on April 1, then the lease can be terminated on May 30. If written notice is provided on April 2, then the lease cannot be terminated until June 29. In delaying notice until after the first of the month, the tenant makes himself responsible for another month of rent. That's one expensive day!

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

State whether or is being used in the exclusive or inclusive sense in the given statement.
185) The prize is a new car or $10,000 cash.
    A) Inclusive   B) Exclusive
    Answer: B

Choose the first set in the list natural numbers, whole numbers, integers, rational numbers, and real numbers that describes the following number.
186) -13
   A) Integers   B) Natural numbers   C) Whole numbers   D) Rational numbers
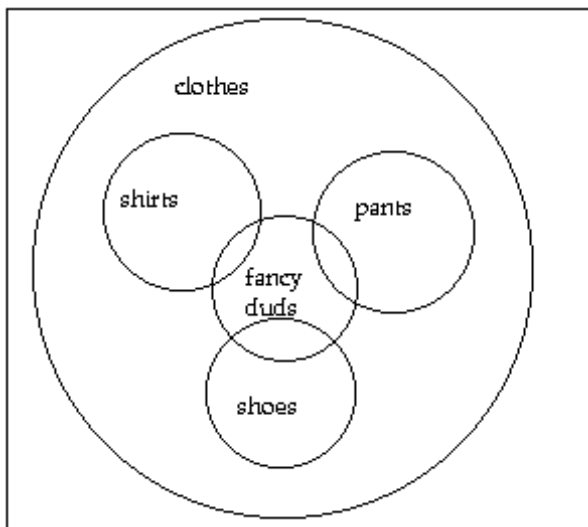   Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Determine the truth of the premises, discuss the strength of the argument, and assess the truth of the conclusion.
   187) Premise: Calvin Coolidge was over 35 years old when he became President of the United States.
        Premise: Bill Clinton was over 35 years old when he became President of the United States.
        Premise: Ronald Reagan was over 35 when he became President of the United States.
        Conclusion: Every United States politician is at least 35 years old.

        Answer: Answers may vary. Possible answer: The premises are true. The strength of the argument is relatively
                weak. First, the examples may have been cherry picked from all the presidents (43 and counting). Second,
                the examples are of presidents, not of United States politicians in general. The conclusion is false.
                Although one must be at least 35 years old to be President of the United States, one can be younger and
                still occupy many other positions.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the statement is a proposition.
   188) Go fly a kite.
        A) Proposition   B) Not a proposition
        Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

A set of propositions is listed. Draw a Venn diagram that represents all the information in the propositions and use it
(and no other assumptions) to answer the question. Explain your reasoning.
   189) No dogs are cats. No gerbils are cats. All dogs have fleas. Some cats are thirsty. No thirsty creatures have fleas.
        Question: Could a gerbil be a dog?

        Answer: Answers may vary. One possibility:
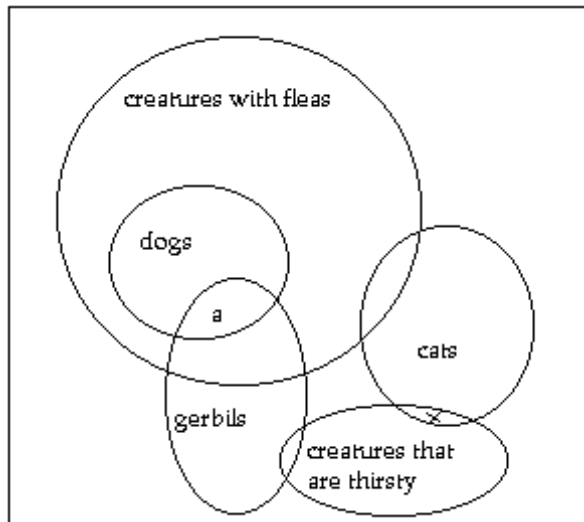
        Yes, a gerbil could be a dog. We know from the first proposition that the set "dogs" is disjoint from the set
        "cats," and we know from the second proposition that the set "gerbils" is disjoint from the set "cats."
        However, we do not know the relationship between the sets "dogs" and "gerbils." It is possible that the two
        sets are not disjoint; if so, they will overlap in region a. A gerbil who is a dog would necessarily have
        fleas, since all dogs have fleas. Such a gerbil would not be thirsty, since no thirsty creatures have fleas.

The statement connects two individual propositions with the word or. State whether the entire statement is true or false, and explain why.

190) The grass is wet or the grass is dry.

Answer: True. If the first proposition is false (the grass is not wet), then the second proposition is true (the grass is dry). If the second proposition is false (the grass is not dry), then the first proposition is true (the grass is wet). Thus, one of the propositions is true, so the disjunction is true.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Evaluate the validity of the chain of conditionals.

191) Premise: If I pay my bills on time, then my credit will be good.
Premise: If my credit is good, then I will become a movie star.
Conclusion: If I pay my bills on time, then I will become a movie star.
   A) Valid   B) Invalid

Answer: A

Rephrase the statement as a conditional proposition with the form "if p, then q."

192) Attending practice is necessary for staying on the team.
   A) If you attend practice, then you must stay on the team.
   B) If you stay on the team, then you must attend practice.
   C) If you don't attend practice, then you must stay on the team.
   D) If you don't stay on the team, then you must not attend practice.

Answer: B

Make a truth table for the given statement. The letters p, q, r, s represent propositions.

193) p or q

A)

p	q	p or q
T	T	F
T	F	F
F	T	F
F	F	T

B)

p	q	p or q
T	T	T
T	F	T
F	T	T
F	F	F

C)

p	q	p or q
T	T	T
T	F	F
F	T	T
F	F	F

D)

p	q	p or q
T	T	T
T	F	F
F	T	F
F	F	F

Answer: B

Write the converse, inverse, or contrapositive off the proposition, as indicated.

194) If the sun shines, they will bask. (inverse)
   A) If they do not bask, then the sun shines.
   B) If the sun does not shine, then they will not bask.
   C) If they do not bask, then the sun does not shine.
   D) If they bask, then the sun shines.

Answer: B

Choose the first set in the list natural numbers, whole numbers, integers, rational numbers, and real numbers that describes the following number.

195) -21.1
   A) Integers   B) Real numbers   C) Natural numbers   D) Rational numbers

Answer: D

1) C
2) True. Both individual propositions are true, so the conjunction is true.
3) B
4) Does not make sense. In this context, the word "positive" means "indicating the presence of." The fact that the results were not positive for cancer suggests that you don't have cancer. Perhaps there is an unusual explanation for why that would make you upset (e.g., masochism), but in general it does not make sense. (Explanations will vary.)
5)
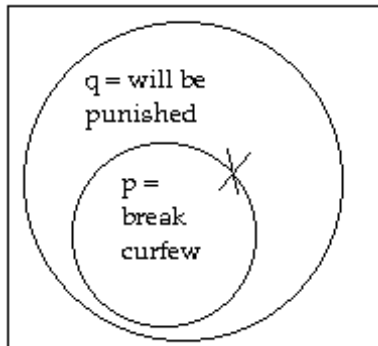
The type of argument is called Affirming the Conclusion. We have p = you break curfew and q = you will be punished. The second premise asserts that Thelma was punished, which we show by putting an X in the q circle. However, the premise says nothing about whether Thelma broke curfew, so we put the X on the border of the p circle to indicate that we don't know whether the X belongs inside or outside this circle. The Venn diagram shows that the premises do not lead necessarily to the conclusion, so the argument is invalid. Thelma may have been punished for some other reason.
6) A
7) Answers may vary. One possibility:

8) Does not make sense. A quarter of an hour is 15 minutes, while the time between 6:50 and 7:10 is 20 minutes. It takes him five more minutes to shower, so to do it to save time doesn't make sense. (Explanations will vary.)
9) Answers will vary. The structure of the argument should be as follows:
Premise: If p, then q.
Premise: p is true.
Conclusion: q is true.

The argument is valid.
10) A

11) True. Both individual propositions are true, so the conjunction is true.
12)
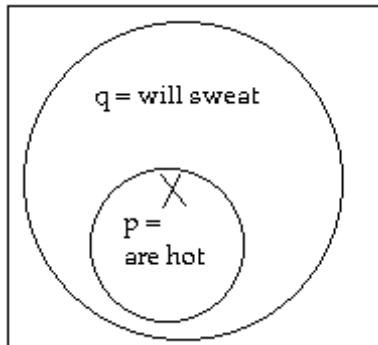
The type of argument is called Affirming the Hypothesis. We have p = you are hot and q = you will sweat. The second premise asserts that James is hot, which we show by putting an X in the p circle. Because the X is also in the q circle, q must also be true for James. The Venn diagram shows that the premises lead necessarily to the conclusion, so the argument is valid.

13) It is unclear whether the year in which $50,000 was collected was 1996 or 2000.
14) B
15) D
16) Answers may vary. One possibility: The person stating this opinion may not like the smell of cigarettes and cigars. He may not like the smell getting into his clothes and causing him to spend more money on dry cleaning. In addition, he may find second-hand smoke unpleasant because it irritates his eyes.
17) D
18) Makes sense. You might think the statement does not make sense since the definition of "unconscious" is not actually "not located in the United States"and the assertion about Florida does not, on its own, make sense. However, the only question is whether if the definition were correct, the assertion about Florida would be correct. If "unconscious" means "not located in the United States," then "Florida is not unconscious" could be rephrased as "Florida is not not located in the United States" and then, replacing the double negation, "Florida is located in the United States." That assertion is clearly true. (Explanations will vary.)
19) C
20) B
21) B
22) C
23) A
24) Answers may vary. Possible answer: Since the example is fictitious, there is no way to determine the truth of the premise. The argument is weak. Perhaps my friend studies harder than I do, perhaps my friend cheats in his classes, or perhaps I get higher grades in biology, history, and art. Moreover, academic smarts are only one measure of intelligence. Since the example is fictitious, there is no way to assess the truth of the conclusion.
25) C
26) B
27) Does not make sense. The set of integers includes the whole numbers and their negatives, and thus the set of whole numbers is a subset of the set of integers. As such, all members of the set of whole numbers are also members of the set of integers. Therefore, if the answer to the question is a whole number it must also be an integer. (Explanations will vary.)

28)
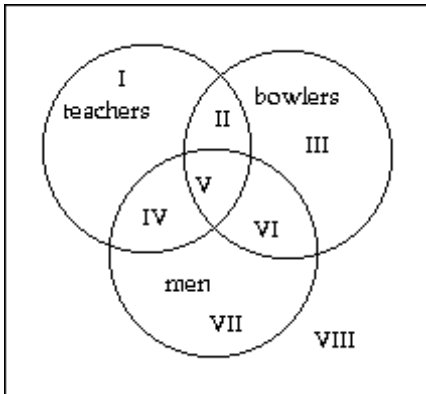
I = female teachers who are not bowlers
II = female teachers who are bowlers
III = female bowlers who are not teachers
IV = male teachers who are not bowlers
V = male teachers who are bowlers
VI = male bowlers who are not teachers
VII = men who are neither teachers nor bowlers
VIII = women who are neither teachers nor bowlers

29) Answers may vary. One possibility: The relative cost of the two options depends primarily on how many minutes per month you use. The new company's plan would cost ≤ $30 for up to 700 minutes a month, since $20 + $0.05(700 - 500) = $30. Therefore, if you expect to use less than 700 minutes a month, you would tend to profit from switching companies. However, there are other factors to consider:
Does one company have more dependable cellular service? Better sound quality? Better customer service? You should also look for hidden costs. For example, if you switch companies, you may need to buy a new cell phone.

30) Answers may vary. Possible answer: The premises are true. The strength of the argument is relatively weak, since things aren't always named logically and consistently. (For example, the months September, November, and December all end in "ember", but none of the other nine months do!) The conclusion is true.

31)
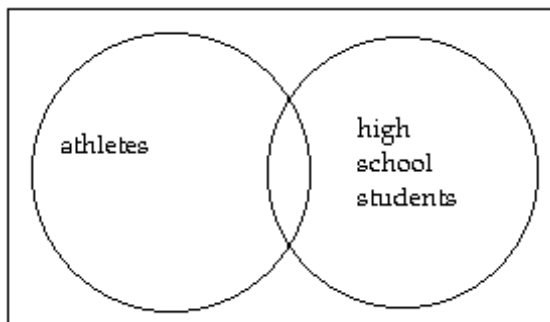
The sets are overlapping. It is possible for a person to be both an athlete and a high school students, but not all athletes are high school students and not all high school students are athletes.

32) A

33) Answers may vary. One possibility: The expression "repealed the ban" is a double negation. In repealing the ban on the resolutions in question, the state assembly in effect allowed them. Since the resolutions are "anti-smoking," a third negation is involved. A triple negation (not not not p) has the opposite truth value as the original proposition p. In short, the assembly is now allowing resolutions that prohibit smoking. If one were a lobbyist for the tobacco companies, this might be a setback.

34) B

35)
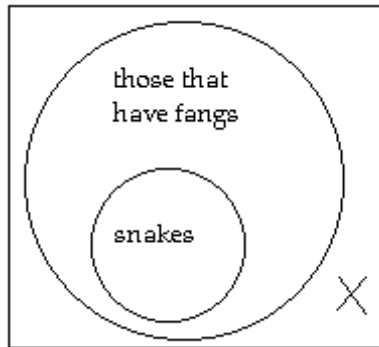
The X represents Teri's pet. The conclusion follows necessarily from the premises, and the argument is valid.

36) Does not make sense. The strength of an inductive argument is not necessarily related to the truth of its conclusion. The argument "The earth rotates around the sun because I said so" is extremely weak, but its conclusion happens to be true. For a long time people found the argument "The sun rotates around the earth" to be quite compelling, but its conclusion turned out to be false. (Explanations will vary.)

37) B
38) B
39) B
40) D
41) A
42) Answers may vary. One possibility:
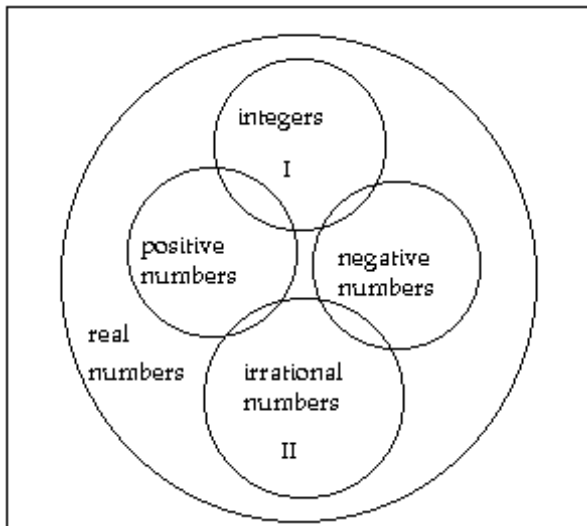
Note that there is exactly one element in region I, since the number 0 is the only integer that is neither negative nor positive. Note also that there are no elements in region II, since each irrational number is either negative or positive.

43) A
44) A

45) Answers may vary. One possibility: The answer depends on how many miles you drive the car. If you know you will drive less than 100 miles, then the daily rate is a better option, since $20/day × 4 days + $0.20/mi × 100 mi = $100. If you know you will drive more than 100 miles, then the weekly rate is a better option. If you aren't sure, then the weekly rate is probably preferable since the risk is limited. Even if you drove the minimum (zero miles), you would only spend $20 more by choosing the weekly rate. But for every 100 miles after the first 100, you would save $20 with the weekly rate. If you drive 500 miles, that's $80 in savings. You should also consider a hidden factor. If you might end up only needing the car 1-3 days, then the daily rate will tend to be a better option. However, if you might end up needing the car for 5-7 days, then the weekly rate is a better option since those days will not cost you extra.

46) Answers may vary. Possible answer: Mayor Brown has not said that he is not concerned with improving the quality of children's education, merely that he opposes this particular tax increase to build new schools. (Perhaps he would prefer a tax increase to improve the current schools instead of building new ones, or perhaps he thinks the quality of education can be improved without raising taxes) Mayor Brown's opponent has distorted his views. Any argument based on a distortion of someone else's ideas or beliefs is called a straw man.

47) The subject set is "flight attendants" and the predicate set is "men."
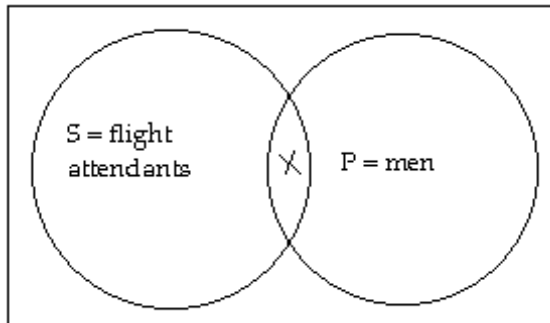
The X indicates that the overlapping region has at least one member. No claim is made about whether other regions also have members.

48) Answers may vary. Possible answer:
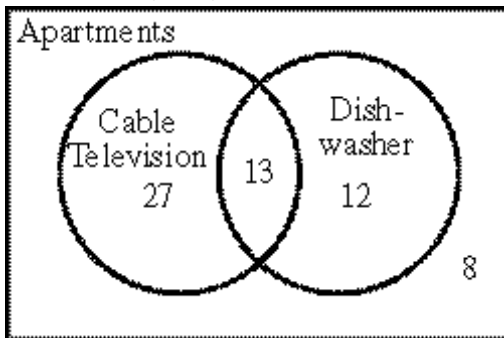
49) C
50) A

51) Answers may vary. Possible answer:

Students

Girls 4

8

Right Handed 10

5

52) Answers may vary. Possible answer:

Pet owners

Dog 38

12

Cat 21

9
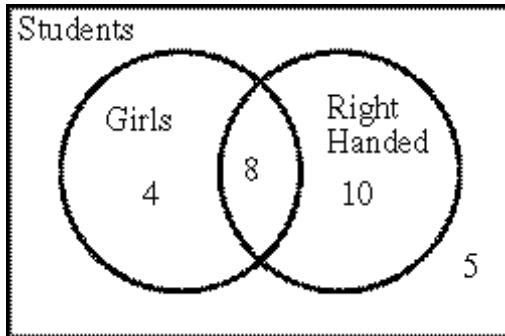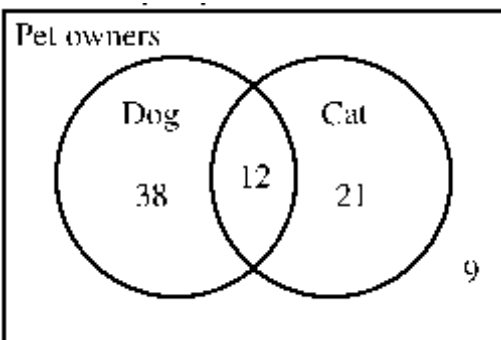
53) Does not make sense. It is true that if A and B are disjoint sets, then an object cannot be a member of both sets. However, that does not mean it has to be a member of either set. It can also be a member of neither. The X in the following diagram represents an object that is a member of neither set A nor set B. If set A were the set of animals, and set B were the set of vegetables, then the X might represent a mineral. (Explanations will vary.)

X

A

B
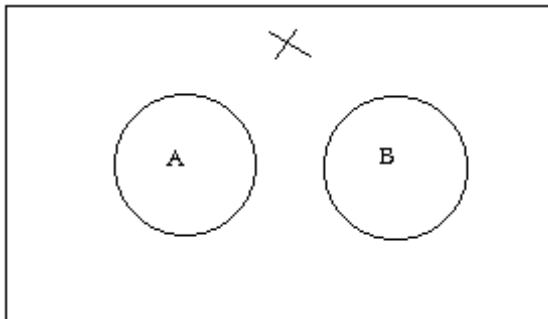
54)

The set "cars" is a subset of the set "motor vehicles." Every car is a motor vehicle, but there are some motor vehicles, such as trucks, that are not cars.

55) D

56) C

57) Answers may vary. Possible answer: The premises tells us that one thing (bringing the umbrella) happened before another (it didn't rain), but they don't prove any connection between them. That is, we cannot conclude that bringing the umbrella was the cause of the fact that it didn't rain. The fact that one event came before another is not proof that the first event caused the second event.

58) B

59)
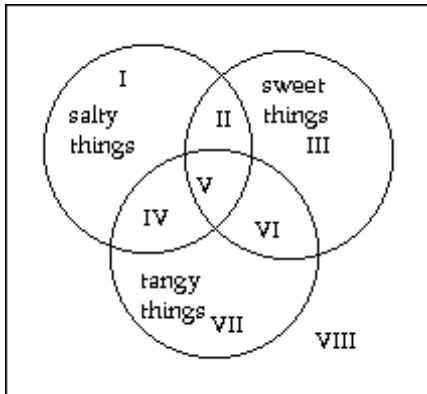
I = things that are salty, but neither sweet nor tangy
II = things that are both salty and sweet, but not tangy
III = things that are sweet, but neither salty nor tangy
IV = things that are salty and tangy, but not sweet
V = things that are salty, sweet, and tangy
VI = things that are sweet and tangy, but not salty
VII = things that are tangy, but neither sweet nor salty
VIII = things that are neither salty, sweet, nor tangy

60) A

61) A

62) Answers may vary. Possible answer: The premises are true. The argument is relatively strong, and the conclusion is true.

63) C

64) Makes sense. An argument is valid if its conclusion follows necessarily from its premises, regardless of the truth of its premises or conclusions. An argument is sound if it is valid and its premises are all true. Many valid arguments have false premises and are thus not sound. For example:
Premise: When I close my eyes, I become invisible.
Premise: When I am invisible, I can speak Portugese.
Conclusion: When I close my eyes, I can speak Portugese.
The argument is valid, but its premises are clearly false so it isn't sound. (Explanations will vary.)

65) B

66) Answers may vary. One possibility: The person stating this opinion may not like one of his current senators (or may even want the job for himself!). In addition, he may want the balance of power to shift from the legislative branch to the executive branch and may feel that term limits will give senators less overall influence.

67) Answers may vary. One possibility: A "no" vote means that you believe that the state legislature should have the authority to restrict religious expression.

68) Does not make sense. For this to be true, all the time you spent studying would have to be time you also spent playing basketball. This could be true if you spend literally no time studying or if you did all your reading while dribbling a basketball, but both possibilities strain credulity. (Explanations will vary.)

69)
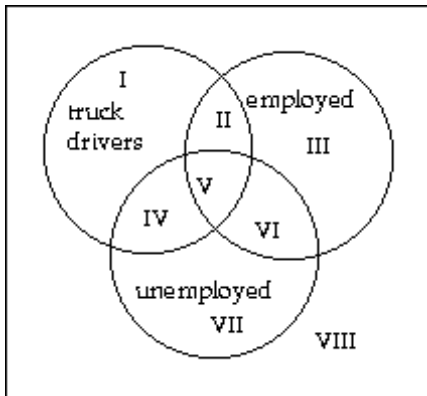
I* = truck drivers who are neither employed nor unemployed
II = employed truck drivers
III = non-truck drivers who are employed
IV = unemployed truck drivers
V* = truck drivers who are both employed and unemployed
VI* = non-truck drivers who are both employed and unemployed
VII = non-truck drivers who are unemployed
VIII* = non-truck drivers who are neither employed nor unemployed

*This region has no members.

70) C

71) Answers may vary. Possible answer:
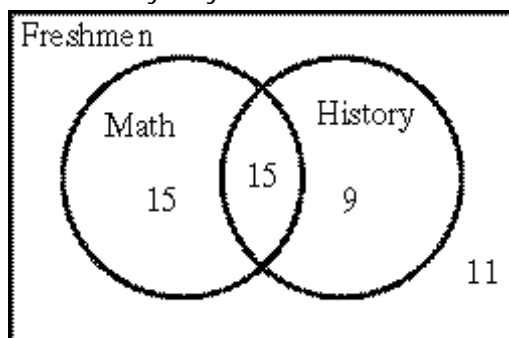
72) It is unclear whether 4000 is the number of eligible voters or 25% of the number of eligible voters (which would make 16,000 the number of eligible voters).

73) D

74) Answers may vary. One possibility: Since "does not oppose" is a double negation, the councilman supports the measure. The term "anti-pollution" is an additional negation, so in supporting the measure, the councilman is acting against pollution. A triple negation (not not not p) has the opposite truth value as the original proposition p.

75) Answers may vary. One possibility:
Four consecutive terms is too many.
The incumbent is running in the election.

76) B

77) B

78) Does not make sense. Candace is paying an additional $25 per month ($300 per year) to get a $500 deductible. However the deductible (what you pay out of pocket before the insurance kicks in) is a cost, not a benefit! All other things being equal, policy A is clearly the better deal. (Explanations will vary.)

79) Answers may vary. One possibility: The dictator may believe that an unarmed populace is easier to control.

80) A

81) In standard form: No beggars are choosers.
The subject set is "beggars" and the predicate set is "choosers."
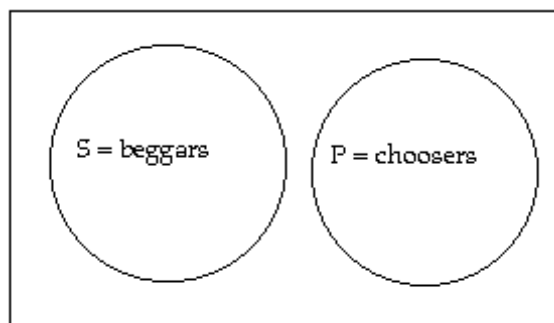
82)
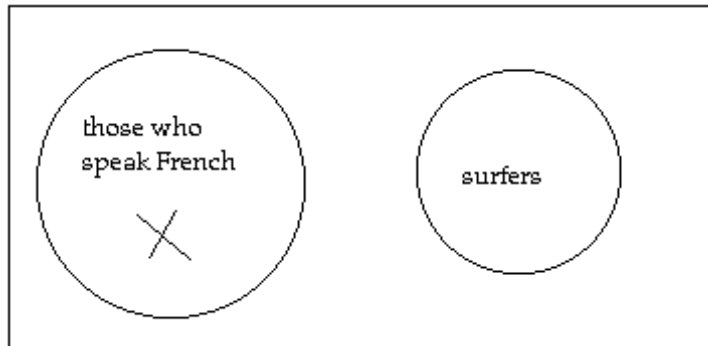
The X represents Pierre. The conclusion follows necessarily from the premises, and the argument is valid.

83) D

84) Makes sense. Generally it takes two circles to draw a Venn diagram for two sets, for example when the sets are overlapping or disjoint. Even when one set is the subset of the other, it generally takes two circles to draw a Venn diagram. However, if the two sets are equal, then they have precisely the same members and the same circle describes both sets. Incidentally, if two sets are equal then they are both subsets of each other. (Explanations will vary.)

85) B

86) Answers may vary. Possible answer: If we can consider this an argument at all, it has the form
Premise: You want your family to be happy and attractive.
Conclusion: You should eat at Ma & Pa's Restaurant.
The argument appeals to emotion, not logic. The advertisers hope that the image of happy and attractive people will evoke positive emotions and make you want to eat at the restaurant. In other cases, the appeal is to negative emotions.

87) Does not make sense. An argument is valid if its conclusion follows necessarily from its premises, regardless of the truth of its premises or conclusions. An argument is sound if it is valid and its premises are all true. By definition, if an argument is sound it is also valid. To put it another way, the set of sound arguments is a subset of the set of valid arguments. (Explanations will vary.)

88) Answers may vary. One possibility:
Option 1 (buying a power mower) will cost you $240 ($340 - $100).
Option 2 (renting a power mower) will cost you $240 (12 × $20).
Option 3 (hiring the neighbor's son) will cost you $240 ($10 × 2 × 12).
The cost of each of the three options appears to be equal. Let's see if there are hidden factors that might help you make a decision. Options 1 and 2 require you to mow the lawn yourself each week. Your time could be spent doing other things (including earning money!), so this is a hidden expense. Then again, you might appreciate the opportunity to exercise, get a tan, and meet the neighbors; so depending on your preferences this could actually be a hidden benefit. Option 1 requires you to resell the mower at the end of the summer. Unless there is a buyer in place (e.g., has the owner of the home or the hardware store already offered to buy it back?), you will have to spend time and energy negotiating the sale of the used mower. Option 2 most likely requires you to pick up and drop off the mower each week. When all the costs are considered, Option 3 might end up being the least expensive, but there are some hidden factors there, too. What happens if the neighbor's son does an unsatisfactory job? What if it takes him more than 2 hours to complete the job? Are you obliged to pay him for the additional time?

89) C

90) B

91) A

92) Does not make sense. By using false assumptions for premises, it is possible to create a solid argument even for a conclusion that is clearly false. (Explanations will vary.)

93) Yes, Julia must file a return. She is a married person under 65 years of age who can be claimed as a dependent on another person's tax return. As such, she must file a return if any of (i)-(iv) apply.
(i) does not apply since $200 < $750;
(ii) does not apply because $3800 < $3925;
(iii) does not apply because although her spouse (Bret) files a separate return, he does not itemize;
(iv) does apply. Part (b) is a little confusing. It says to start with earned income, but only earned income up to $3675. Since $3800 > $3675, we start with $3675. Then we add $250 to get $3925. The greater of (a) $750 or (b) $3925 is clearly $3925. The total of Julia's earned and unearned income is $4000 ($3800 + $200). Since $4000 > $3925, (iv) applies and Julia must file a return. (Explanations will vary.)

94) C
95) A
96)

The set "soft drinks" is a subset of the set "beverages." All soft drinks are beverages, but some beverages (e.g., water) are not soft drinks.

97) Answers will vary. The structure of the argument should be as follows:
Premise: If p, then q.
Premise: p is not true.
Conclusion: q is not true.

The argument is invalid.

98) D
99) C
100) D
101) Answers may vary. One possibility: There are four negations in that statement: cannot, oppose, those who are against, and deregulation. A quadruple negation (not not not not p) has the same truth value as the original proposition p. In short, the Senator is for regulation of the area in question.
102) B
103) B
104) Answers may vary. Possible answer: The conclusion of this argument (our food is delicious) is not related to the premise (We've just remodeled the restaurant). This argument represents the fallacy of diversion because it attempts to divert attention from the real issue (the taste of the food) by focusing on another issue (the remodeling of the restaurant). The issue to which attention is diverted is sometimes called a red herring.
105) A
106) B
107) A

108) Answers may vary. One possibility:
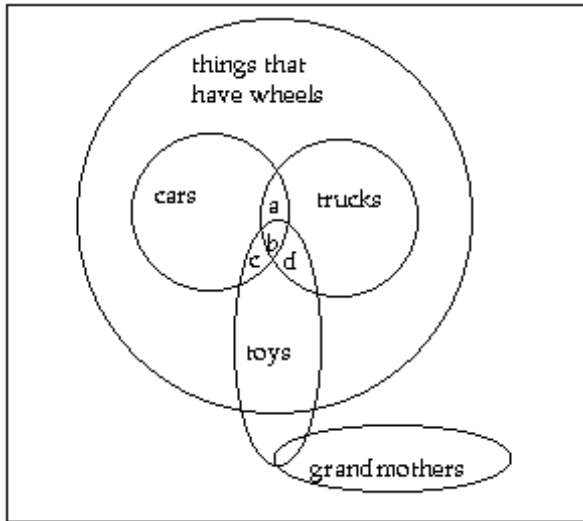
Yes, a car could be both a truck and a toy. We know from the first two propositions that the set "cars" and the set "trucks" are subsets of the set "things that have wheels," but we do not know whether the two subsets are disjoint or overlapping or whether one is a subset of the other. We know from the third proposition that the set "toys" overlaps the set "things that have wheels," but we do not know whether it also overlaps either or both of the sets "cars" and "trucks." Depending on whether or not "cars," "trucks," and "toys" overlap; the regions a, b, c, and d may or may not have any elements. Since region b might have elements, a car could be both a truck and a toy.

109) B

110) Answers may vary. One possibility: This is a double negation. The veto of the bill (presumably by the President) is the first negation. The overriding of the veto is the second negation. The two cancel each other out, and the result is that the communications bill is passed. In general, a double negation (not not p) has the same same truth value as the original proposition p.

111) D

112) The subject set is "positive numbers" and the predicate set is "negative numbers."
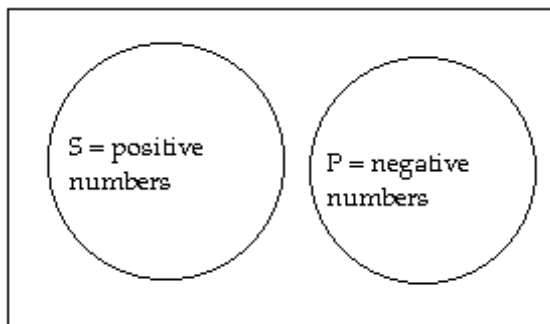
113)
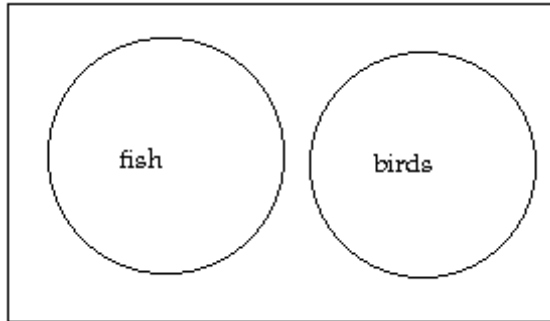
The set "fish" is disjoint from the set "birds" because the two sets have no members in common. A fish cannot be a bird, and a bird cannot be a fish.

114) A

115) B

116) D

117) False. Is is true that the sun is bigger than the moon, but it is not true that the sun rotates around the earth. (The earth rotates around the sun.) Since one of the individual propositions if false, the conjunction is false.

118) Makes sense. By taking out the same amount of money but reducing the number of withdrawals, he saves money on service charges ($0.50 per week). What would make even more sense would be to find a bank that doesn't charge a fee for every transaction. (Explanations will vary.)

119)
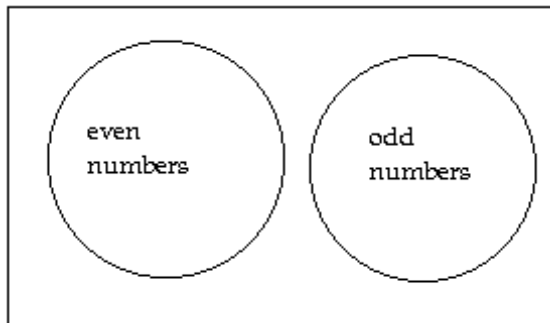
The set "even numbers" is disjoint from the set "odd numbers" because the two sets have no members in common. An even number cannot be odd, and an odd number cannot be even.

120)
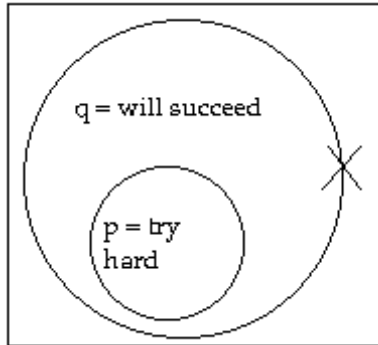
The type of argument is called Denying the Hypothesis. We have p = you try hard and q = you will succeed. The second premise asserts that p is false for you, which we show by putting an X outside the p circle. However, we do not know whether the X should also be outside the q circle, because the premise says nothing about whether you succeeded. Thus, we put the X on the border of the q circle. The Venn diagram shows that the premises do not lead necessarily to the conclusion, so the argument is invalid. It is possible that, despite your not trying hard, you might still succeed.

121) B

122) Answers will vary. The structure of the argument should be as follows:
Premise: If p, then q.
Premise: q is not true.
Conclusion: p is not true.

The argument is valid.

123) C

124) Answers may vary. One possibility:
Safer bikes are better bikes.
Buying a new braking system for Jeremy's old bike is not a reasonable option.

125) Yes, Kevin must file a return. He is a married person under 65 years of age who can be claimed as a dependent on another person's tax return. As such, he must file a return if any of (i)-(iv) apply.
(i) does not apply since $700 < $750;
(ii) does not apply because $3500 < $3925;
(iii) does not apply because although his spouse (Linda) files a separate return, she does not itemize;
(iv) does apply. The total of earned and unearned income ($3500 + $700 = $4200) is greater than both (a) $750 and (b) earned income (up to $3675) plus $250 ($3500 + $250 = $3750). Thus, Kevin must file a return. (Explanations will vary.)

126) In standard form: All movies are things that are entertaining.
The subject set is "movies" and the predicate set is "things that are entertaining."
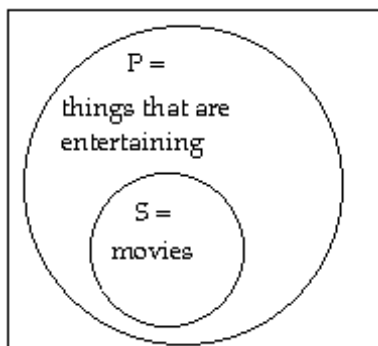
127) The subject set is "singers" and the predicate set is "children."
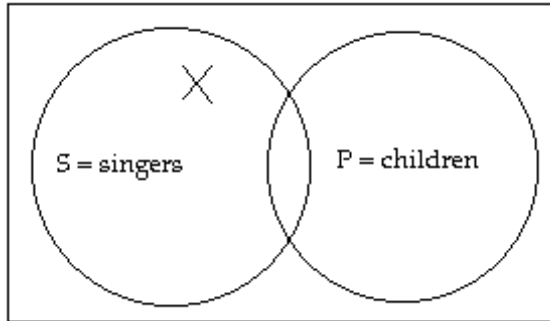
The X indicates that the non-overlapping region of the "singers" circle has at least one member. No claim is made about whether other regions also have members.

128) D

129) Answers may vary. One possibility:
Cardiovascular exercise leads to a strong heart.
Being healthy is important.

130) A

131) Answers may vary. One possibility:
I do not want to get wet.
It is not raining inside; that is, the roof is keeping the rain outside.

132) Answers may vary. One possibility: Since driving costs $16 ($5 + $10 + $1 = $16) per day and taking the train costs $14.50 ($6.50 × 2 + $1.50 = $14.50) per day, it appears that taking the train is a better option. However, you should also consider other factors. If you have a spouse who might need the car during the day, then that's another reason to take the train (that would also save you the $1.50 parking fee). If you take the train, you might be able to read the newspaper or do work on the way to work. However, if the train tends to be crowded and you prefer being alone, then it might be worth the extra $1.50 per day to drive.

133) Does not make sense. For an argument to be valid, its conclusion must follow necessarily from its premises. Just because the premises and the conclusion are true does not mean the conclusion follows necessarily from the premises. For example, consider the following argument:
Premise: Dogs bark.
Premise: Cats meow.
Conclusion: Pigs oink.
The premises and the conclusion are all true, but the conclusion has nothing to do with the premises. (Explanations will vary.)

134) A

135) A

136)
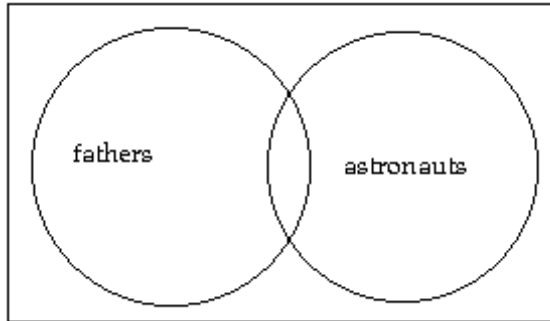
The sets are overlapping. It is possible for a person to be both an astronaut and a father, but not all astronauts are fathers and certainly not all fathers are astronauts.

137) False. Springfield is the capital of Illinois, but Chicago is not the capital of Illinois. (Even if you don't know the capital of Illinois, you can determine that at least one of the propositions is false.) Since one of the individual propositions is false, the conjunction is false.

138) B

139) A

140) Answers may vary. One possibility:
Paying bills late will result in bad credit.
It is important to be able to get a loan.

141) A

142) B

143) A

144) A

145) Answers may vary. One possibility:
An unattended campfire is illegal.
Getting a citation from the park ranger would be a bad thing.

146) Answers may vary. One possibility: It will cost her $575 to stay overnight ($400 + $100 + $75), and it will cost her $700 to fly back the same day. It appears that staying overnight is the better option, since it will save her $125. However, she could consider other factors before making a decision. Will staying overnight force her to miss all or part of a day of work? If so, that could cost her more than $125. Is it important to her to be home with her family? If so, the potential $125 savings may be illusory. Then again, she might enjoy having a night to herself and ordering room service.

147) Does not make sense. Arguing logically may not change the other person's position, but it can help the other person understand you, and vice versa. (Explanations will vary.)

148) D

149) D

150) Does not make sense. The contrapositive of "If p, then q" is "If not q, then not p." The contrapositive of "If you have $5, then you will buy a hot dog" is "If you will not buy a hot dog, then you don't have $5." What is actually given is the inverse. (Explanations will vary.)
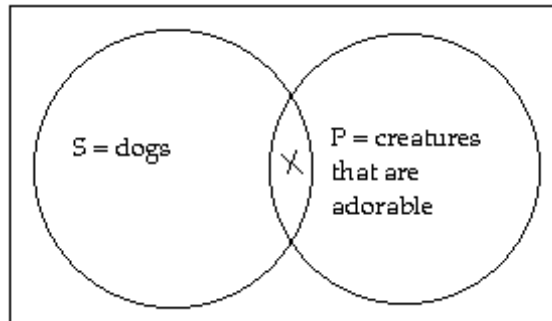
151) D

152) In standard form: Some dogs are creatures that are adorable.
The subject set is "dogs" and the predicate set is "creatures that are adorable."
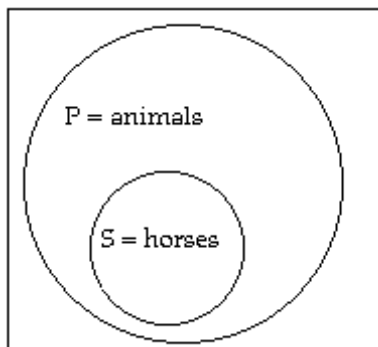

The X indicates that the overlapping region has at least one member. No claim is made about whether other regions also have members.
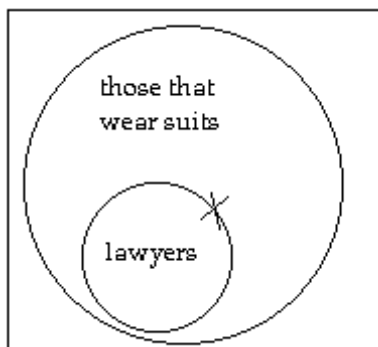
153) D

154) Answers may vary. Possible answer: The premise is false. Most of the sports listed are played with a ball, but hockey is played with a puck. The argument is weak, and the conclusion is false. Many sports, in addition to hockey, do not involve a ball, including wrestling, swimming, and skiing.

155) B

156) The subject set is "horses" and the predicate set is "animals."


157)

The X represents Jack. We do not have enough information to know whether the X should be inside or outside the "lawyers" circle. Therefore, the conclusion does not follow necessarily from the premises, and the argument is invalid.

158) Answers may vary. One possibility: The union head should ask for more information. Even though management has apparently agreed to the demand for a 15% increase in the overtime wage rate, it is not clear that the overall deal is a good one. It is entirely possible that management has lowered the hourly wage rate, reduced the benefits, or made other changes to the contract to the detriment of the members of the union. Before making any promises, before giving up leverage by ending the strike, and certainly before signing anything; these issues must be clarified.

159) True. Both individual propositions are true. The disjunction is true if either or both propositions are true.

160) Does not make sense. Learning the fancy names for the fallacies is far less important than learning to recognize the faulty reasoning. (Explanations will vary.)

161) Answers may vary. One possibility: Taking taxis will cost you $22 (2 trips × $11/trip), while driving will cost you $24 (2 days × $10/day + 2 trips × $2/trip). Driving appears to be a better option. However, before you make your decision, you should consider hidden costs and benefits. What if your trip is extended or your return flight is delayed? Each additional day of long-term parking will cost you $10. In addition, there is the wear-and-tear on the car and the fact that your car would be left in a public lot, where the risk of theft or vandalism might be greater. Those factors would make taking taxis the better option. On the other hand, if you are on a tight schedule, you might not want to rely on a taxi to pick you up on time.

162) B

163) Answers may vary. One possibility: No. There is too much missing information and too many red flags. Why is the cousin of an acquaintance willing to give you such a good deal? Perhaps he's just a generous guy, but there are other possibilities to consider. He claims it's "the same watch," but how do you know it's not counterfeit? Even if it's authentic, how do you know it's not used or broken? Even if it's in mint condition, how do you know it's not stolen? In trying to save money, you might cost yourself money or even end up in jail.

164)
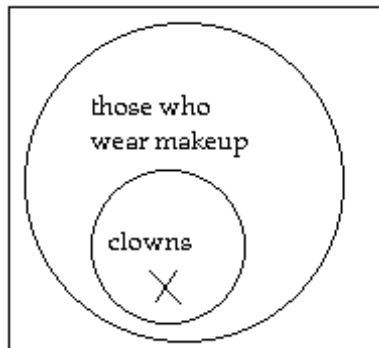
The X represents Bozo. The conclusion follows necessarily from the premises, and the argument is valid.

165) Does not make sense. There are four basic structures for conditional arguments. Two of them, "Affirming the Conclusion" and "Denying the Hypothesis," are invalid. The other two, "Affirming the Hypothesis" and "Denying the Conclusion," are valid. Since it might be an example of ""Denying the Conclusion," it is not true that it must be an example of "Affirming the Hypothesis." (Explanations will vary.)

166) A

167) A

168) False. Since there are 26 letters in the English alphabet, the first proposition is false. Since the letter c is not a vowel but a consonant, the second proposition is false. Since both propositions are false, the disjunction is false.

169) Answers will vary. The structure of the argument should be as follows:
Premise: If p, then q.
Premise: q is true.
Conclusion: p is true.

The argument is invalid.

170) It is unclear whether the two stores combined have more than 1000 pieces of merchandise or whether each store itself has more than 1000 pieces of merchandise.

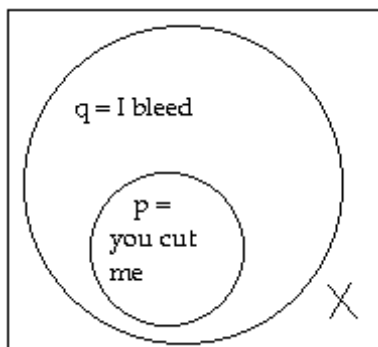171) True. Although cats do not read books, dogs do bark. The disjunction is false only if both individual propositions are false.

172) B

173) B

174) Answers may vary. One possibility: If you lease the car for two years, it will cost $9200 ($2000 + 24 months × $300/month). If you buy it, it will cost $8000 ($20,000 - $12,000). At first glance, it appears that buying is a better option. However, you need to consider other factors before you make your decision. How do you know that you will be able to sell the used car for $12,000 in two years? If your estimate is off by only 10% ($1200), then leasing will already be as cost-effective. In addition, you need to consider how the time value of money makes buying a less attractive option. The higher the interest rate, the more it will implicitly cost to buy the car (whether you borrow and pay interest expense or pay cash and forego interest income). Moreover, you should read all the fine print of the lease agreement. Are you locked into the lease for two years? Can you keep it longer if you wish? Are there any additional costs due when you return the car?

175) D

176) C

177)
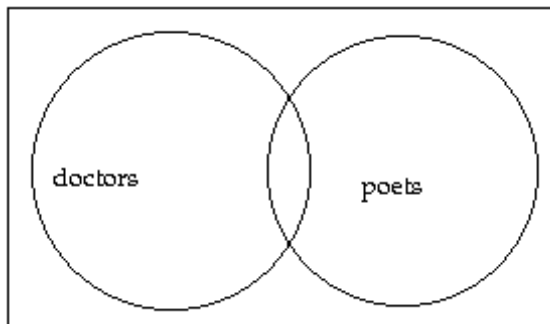
The sets are overlapping. It is possible for a person to be both a doctor and a poet, but a doctor is not necessarily a poet and a poet is not necessarily a doctor.

178) False. The proposition 6 + 7 = 13 is true, but the proposition 9 × 4 = 45 is false. Since one of the individual propositions is false, the conjunction is false.

179) Answers may vary. Possible answer: The premise of this argument cites one case in which Isabelle ate vegetarian food. But one case is not enough to establish a pattern, let alone to conclude that Isabelle always eats vegetarian food.

180)

The type of argument is called Denying the Conclusion. We have p = you cut me and q = I bleed. The second premise asserts that q is false for me, which we show by putting an X outside the q circle. Since the p circle is inside the q circle, the X is outside the p circle, too. The Venn diagram shows that the premises lead necessarily to the conclusion, so the argument is valid.

181) D

182) Does not make sense. The second proposition is the negation of the first proposition. If a proposition is true, then its negation must be false, and vice versa. Thus, the two propositions cannot both be true. But, you argue, I was hungry at 7:00 this morning, but then I ate breakfast and I was not hungry at 8:00. The explanation is that "I was hungry at 7:00 this morning" and "I was hungry at 8:00 this morning" are two different propositions. The first one is true and its negation is false, while the second one is false and its negation is true. (Explanations will vary.)

183) Answers may vary. One possibility:
Healthy teeth are important.
Healthy gums are important.

184) Answers may vary. One possibility: If written notice is provided on April 1, then the lease can be terminated on May 30. If written notice is provided on April 2, then the lease cannot be terminated until June 29. In delaying notice until after the first of the month, the tenant makes himself responsible for another month of rent. That's one expensive day!

185) B

186) A

187) Answers may vary. Possible answer: The premises are true. The strength of the argument is relatively weak. First, the examples may have been cherry picked from all the presidents (43 and counting). Second, the examples are of presidents, not of United States politicians in general. The conclusion is false. Although one must be at least 35 years old to be President of the United States, one can be younger and still occupy many other positions.

188) B

189) Answers may vary. One possibility:
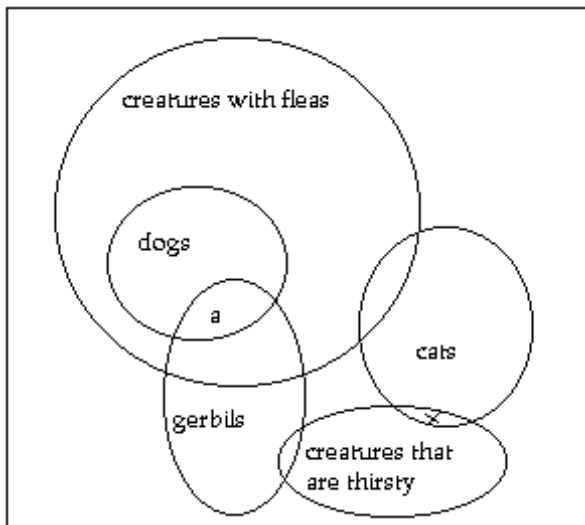
Yes, a gerbil could be a dog. We know from the first proposition that the set "dogs" is disjoint from the set "cats," and we know from the second proposition that the set "gerbils" is disjoint from the set "cats." However, we do not know the relationship between the sets "dogs" and "gerbils." It is possible that the two sets are not disjoint; if so, they will overlap in region a. A gerbil who is a dog would necessarily have fleas, since all dogs have fleas. Such a gerbil would not be thirsty, since no thirsty creatures have fleas.

190) True. If the first proposition is false (the grass is not wet), then the second proposition is true (the grass is dry). If the second proposition is false (the grass is not dry), then the first proposition is true (the grass is wet). Thus, one of the propositions is true, so the disjunction is true.

191) A

192) B

193) B

194) B

195) D