

Math 118 Study Guide

This study guide is for practice only. The actual question on the final exam may be different.

Convert the symbolic compound statement into words.

- 1) p represents the statement "It's Monday."
 q represents the statement "It's raining today."

Translate the following compound statement into words:

$$\sim p \vee \sim q$$

- A) It's not Monday and it's not raining today. B) It's not Monday or it's not raining today.
 C) It's Monday or it's raining today. D) It's Monday and it's raining today.

Objective: (3.1) Convert Symbolic Compound Statement into Words

Let p represent the statement, "Jim plays football", and let q represent the statement "Michael plays basketball". Convert the compound statement into symbols.

- 2) Jim does not play football and Michael plays basketball.

- A) $p \wedge q$ B) $\sim p \wedge q$ C) $\sim p \vee q$ D) $\sim(p \wedge q)$

Objective: (3.1) Convert Compound Statement into Symbols

Write the compound statement in words.

Let r = "The puppy is trained."

p = "The puppy behaves well."

q = "His owners are happy."

- 3) $(r \wedge p) \rightarrow q$

- A) If the puppy is trained and the puppy behaves well, then his owners are happy.
 B) If the puppy is trained, then the puppy behaves well and his owners are happy.
 C) The puppy is trained and the puppy behaves well if his owners are happy.
 D) If the puppy is trained or the puppy behaves well, then his owners are happy.

Objective: (3.3) Write Symbolic Conditional Statement in Words

Write the compound statement in symbols.

Let r = "The food is good."

p = "I eat too much."

q = "I'll exercise."

- 4) If I exercise, then the food won't be good and I won't eat too much.

- A) $(q \wedge \sim r) \rightarrow \sim p$ B) $\sim(r \wedge p) \rightarrow q$ C) $q \rightarrow \sim(r \wedge p)$ D) $q \rightarrow (\sim r \wedge \sim p)$

Objective: (3.3) Convert Conditional Statement From Words to Symbols

Let p represent a true statement, while q and r represent false statements. Find the truth value of the compound statement.

- 5) $\sim(\sim p \wedge \sim q) \vee (\sim r \vee \sim p)$

- A) False B) True

Objective: (3.2) Find Truth Value of Compound Statement II

Given p is true, q is true, and r is false, find the truth value of the statement.

- 6) $(\sim p \rightarrow \sim q) \wedge (p \rightarrow \sim r)$

- A) True B) False

Objective: (3.3) Find Truth Value of Symbolic Conditional Statement

Write a negation for the statement.

7) Some athletes are musicians.

A) No athlete is a musician.

C) Some athletes are not musicians.

B) Not all athletes are musicians.

D) All athletes are musicians.

Objective: (3.1) Write Negation for Statement

Use De Morgan's laws to write the negation of the statement.

8) It is Saturday and it is not raining.

A) It is not Saturday and it is raining.

C) It is Saturday and it is raining.

B) It is not Saturday or it is not raining.

D) It is not Saturday or it is raining.

Objective: (3.2) Write Negation of Compound Statement

Write the converse, inverse, or contrapositive of the statement as requested.

9) If I were young, I would be happy.

Converse

A) If I were not happy, I would not be young.

C) If I were happy, I would be young.

B) If I were young, I would not be happy.

D) If I were not young, I would not be happy.

Objective: (3.4) Write Converse, Inverse, or Contrapositive

10) $q \rightarrow \sim p$

Inverse

A) $\sim p \rightarrow q$

B) $\sim q \rightarrow p$

C) $p \rightarrow \sim q$

D) $q \rightarrow p$

Objective: (3.4) Write Converse, Inverse, or Contrapositive

11) Love is blind.

Contrapositive

A) If it is not love, it is not blind.

C) If it is blind then it is love.

B) If it is not blind, then it is not love.

D) If it is blind then it is not love.

Objective: (3.4) Write Converse, Inverse, or Contrapositive

Construct a truth table for the statement.

12) $r \vee \sim(s \wedge c)$

A) r	s	c	$r \vee \sim(s \wedge c)$
T	T	T	T
T	T	F	T
T	F	T	T
T	F	F	T
F	T	T	F
F	T	F	T
F	F	T	T
F	F	F	F

B) r	s	c	$r \vee \sim(s \wedge c)$
T	T	T	T
T	T	F	T
T	F	T	T
T	F	F	T
F	T	T	F
F	T	F	T
F	F	T	T
F	F	F	T

Objective: (3.2) Construct Truth Table

13) $\sim(p \wedge q) \rightarrow \sim(p \vee q)$

A) p	q	$\sim(p \wedge q) \rightarrow \sim(p \vee q)$
T	T	T
T	F	T
F	T	T
F	F	T

B) p	q	$\sim(p \wedge q) \rightarrow \sim(p \vee q)$
T	T	T
T	F	F
F	T	F
F	F	T

C) p	q	$\sim(p \wedge q) \rightarrow \sim(p \vee q)$
T	T	F
T	F	F
F	T	F
F	F	T

D) p	q	$\sim(p \wedge q) \rightarrow \sim(p \vee q)$
T	T	F
T	F	T
F	T	T
F	F	T

Objective: (3.3) Construct Truth Table for Conditional Statement

Use a truth table to determine whether the argument is valid.

14) $p \rightarrow q$

$$\frac{\sim q}{\sim p}$$

A) Valid

B) Invalid

Objective: (3.6) Use Truth Table to Test Validity

15) $p \rightarrow \sim q$

$$\frac{q \rightarrow \sim p}{p \vee q}$$

A) Valid

B) Invalid

Objective: (3.6) Use Truth Table to Test Validity

Given a group of students: $G = \{\text{Allen, Brenda, Chad, Dorothy, Eric}\}$ or $G = \{A, B, C, D, E\}$, list and count the different ways of choosing the following officers or representatives for student congress. Assume that no one can hold more than one office.

16) A president, a secretary, and a treasurer, if the president must be a woman and the other two must be men

- A) ABD, CBD, EBD; 3
- B) BAC, BAE, BCE, DAC, DAE, DCE, BCA, BEA, BEC, DCA, DEA, DEC; 12
- C) BAC, BAE, BCE, DAC, DAE, DCE; 6
- D) BAC, BAE, DAC, DAE; 4

Objective: (10.1) List and Count Different Ways to Choose a Committee

Solve the problem.

17) Construct a product table showing all possible two-digit numbers using digits from the set $\{1, 2, 6, 7\}$. List the even numbers in the table.

- A) $\{62, 72\}$
- B) $\{2, 4, 8, 12, 14\}$
- C) $\{12, 16, 22, 26, 62, 66, 72, 76\}$
- D) $\{12, 26, 26, 62, 66, 72, 76\}$

Objective: (10.1) Construct and Use Product Table

18) License plates are made using 2 letters followed by 2 digits. How many plates can be made if repetition of letters and digits is allowed?

- A) 6760
- B) 67,600
- C) 10,000
- D) 456,976

Objective: (10.2) Solve Apps: Fundamental Counting Principle II

- 19) Given a committee of 8 women and 11 men, count the number of different ways of choosing a president, a secretary, and a treasurer, if the president must be a woman and the secretary and treasurer must be men. Assume no one can hold more than one office.
- A) 968 B) 880 C) 440 D) 5814

Objective: (10.2) Solve Apps: Use Counting Principle (Committees)

- 20) Four married couples have reserved eight seats in a row at the theater, starting at an aisle seat. In how many ways can they arrange themselves if there are no restrictions on the seating arrangement?
- A) 40,320 B) 5040 C) 8 D) 16,777,216

Objective: (10.2) Solve Apps: Use Counting Principle (Seating Arrangements)

- 21) A baseball manager has 10 players of the same ability. How many different 9 player starting lineups can he create?
- A) 10 B) 362,880 C) 90 D) 3,628,800

Objective: (10.3) Solve Apps: Permutations

- 22) There are 5 women running in a race. How many different ways could first, second, and third place finishers occur?
- A) 15 B) 10 C) 125 D) 60

Objective: (10.3) Solve Apps: Permutations

- 23) In how many ways can 6 people line up for play tickets?
- A) 6 B) 46,656 C) 720 D) 1

Objective: (10.3) Solve Apps: Permutations

- 24) There are 13 members on a board of directors. If they must form a subcommittee of 5 members, how many different subcommittees are possible?
- A) 371,293 B) 154,440 C) 120 D) 1287

Objective: (10.3) Solve Apps: Combinations

- 25) A student is told to work any 6 out of 10 questions on an exam. In how many different ways can he complete the exam? (The correctness of his answers has no bearing.)
- A) 1,000,000 B) 5040 C) 210 D) 24

Objective: (10.3) Solve Apps: Combinations

- 26) Of the 2,598,960 different five-card hands possible from a deck of 52 playing cards, how many would contain 2 black cards and 3 red cards?
- A) 422,500 B) 1,690,000 C) 1,267,500 D) 845,000

Objective: (10.3) Solve Apps: Combinations

- 27) If a single card is drawn from a standard 52-card deck, in how many ways could it be an ace or a spade?
- A) 1 way B) 16 ways C) 4 ways D) 17 ways

Objective: (10.5) Solve Apps: Additive Counting Principle

- 28) If a single card is drawn from a standard 52-card deck, in how many ways could it be a diamond or a face card?
- A) 13 ways B) 25 ways C) 21 ways D) 22 ways

Objective: (10.5) Solve Apps: Additive Counting Principle

Find the number of ways to get the following card combinations from a 52-card deck.

29) No face cards in a five-card hand

- A) 658,008 ways B) 127,946 ways C) 639,730 ways D) 319,865 ways

Objective: (10.5) Solve Apps: Card Applications

30) All diamonds in a five-card hand

- A) 143 ways B) 3,861 ways C) 2,574 ways D) 1,287 ways

Objective: (10.5) Solve Apps: Card Applications

Solve the problem.

31) If you toss four fair coins, in how many ways can you obtain at least one head?

- A) 5 ways B) 15 ways C) 16 ways D) 4 ways

Objective: (10.5) Solve Apps: Complements Principle of Counting

32) If you toss six fair coins, in how many ways can you obtain at least two heads?

- A) 64 ways B) 63 ways C) 57 ways D) 58 ways

Objective: (10.5) Solve Apps: Complements Principle of Counting

33) Of the 2,598,960 different five-card hands possible from a deck of 52 cards, how many contain at least one red card?

- A) 2,598,959 hands B) 2,533,180 hands C) 1,266,590 hands D) 2,467,400 hands

Objective: (10.5) Solve Apps: Complements Principle of Counting

Find the probability.

34) A bag contains 7 red marbles, 2 blue marbles, and 3 green marbles. What is the probability that a randomly selected marble is blue?

- A) $\frac{1}{6}$ B) $\frac{1}{4}$ C) $\frac{2}{9}$ D) $\frac{7}{12}$

Objective: (11.1) Solve Apps: Theoretical Probability

35) A bag contains 5 red marbles, 2 blue marbles, and 1 green marble. What is the probability that a randomly selected marble is not blue?

- A) 6 B) $\frac{1}{4}$ C) $\frac{4}{3}$ D) $\frac{3}{4}$

Objective: (11.1) Solve Apps: Theoretical Probability

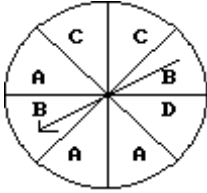
36) A class consists of 24 women and 58 men. If a student is randomly selected, what is the probability that the student is a woman?

- A) $\frac{1}{82}$ B) $\frac{12}{29}$ C) $\frac{12}{41}$ D) $\frac{29}{41}$

Objective: (11.1) Solve Apps: Theoretical Probability

Solve the problem.

37)



What are the odds in favor of spinning an A on this spinner?

- A) 2:6 B) 6:2 C) 4:2 D) 3:5

Objective: (11.1) Solve Apps: Odds

38) A number cube labeled with numbers 1, 2, 3, 4, 5, and 6 is tossed. What are the odds in favor of the cube showing an odd number?

- A) 1:1 B) 3:2 C) 2:1 D) 1:2

Objective: (11.1) Solve Apps: Odds

39) A number cube labeled with numbers 1, 2, 3, 4, 5, and 6 is tossed. What are the odds against the cube showing a 4?

- A) 5:6 B) 1:5 C) 6:1 D) 5:1

Objective: (11.1) Solve Apps: Odds

40) If it has been determined that the probability of an earthquake occurring on a certain day in a certain area is 0.04, what are the odds against an earthquake?

- A) 1 to 25 B) 25 to 1 C) 24 to 1 D) 23 to 1

Objective: (11.1) Solve Apps: Odds

Find the probability.

41) A fair die is rolled. What is the probability of rolling an odd number or a number less than 3?

- A) $\frac{1}{2}$ B) $\frac{5}{6}$ C) $\frac{2}{3}$ D) 1

Objective: (11.2) Solve Apps: Find Probability of (A or B)

42) A card is drawn at random from a well-shuffled deck of 52 cards. What is the probability of drawing a face card or a red card?

- A) $\frac{8}{13}$ B) $\frac{19}{26}$ C) $\frac{15}{26}$ D) $\frac{9}{13}$

Objective: (11.2) Solve Apps: Find Probability of (A or B)

43) A lottery game has balls numbered 0 through 9. If a ball is selected at random, what is the probability of selecting an even numbered ball or a 3?

- A) 2 B) $\frac{2}{5}$ C) $\frac{3}{5}$ D) 5

Objective: (11.2) Solve Apps: Find Probability of (A or B)

44) If you are dealt two cards successively (with replacement of the first) from a standard 52-card deck, find the probability of getting a heart on the first card and a diamond on the second.

A) $\frac{1}{169}$

B) $\frac{13}{204}$

C) $\frac{1}{16}$

D) $\frac{1}{204}$

Objective: (11.3) Solve Apps: Use Special Multiplication Rule

Use the general multiplication rule to find the indicated probability.

45) You are dealt two cards successively (without replacement) from a shuffled deck of 52 playing cards. Find the probability that both cards are black.

A) $\frac{1}{2652}$

B) $\frac{13}{51}$

C) $\frac{25}{51}$

D) $\frac{25}{102}$

Objective: (11.3) Solve Apps: Use General Multiplication Rule

46) Two marbles are drawn without replacement from a box with 3 white, 2 green, 2 red, and 1 blue marble. Find the probability that both marbles are white.

A) $\frac{3}{28}$

B) $\frac{3}{8}$

C) $\frac{3}{32}$

D) $\frac{9}{56}$

Objective: (11.3) Solve Apps: Use General Multiplication Rule

Solve the problem.

47) In a 2-card hand, what is the probability of holding 2 kings?

A) 0.0455

B) 0.0045

C) 0.0055

D) 0.0035

Objective: (11.3) Solve Apps: Find Probability of Combination

48) A basket contains 6 oranges and 4 tangerines. A sample of 3 is drawn. Find the probability that they are all oranges.

A) $\frac{1}{3}$

B) $\frac{1}{5}$

C) $\frac{4}{9}$

D) $\frac{1}{6}$

Objective: (11.3) Solve Apps: Find Probability of Combination

Find the probability.

49) Find the probability that when a 10 question multiple choice test has 4 possible answers for each question, a student will select at least 6 correct answers from the 10 possible.

A) 0.020

B) 0.995

C) 0.118

D) 0.989

Objective: (11.4) Solve Apps: Binomial: Find Prob of At Least/At Most x Successes

50) In one city, the probability that a person will pass his or her driving test on the first attempt is 0.62. 11 people are selected at random from among those taking their driving test for the first time. What is the probability that among these 11 people, the number passing the test is between 2 and 4 inclusive?

A) 0.0729

B) 0.0593

C) 0.0848

D) 0.0764

Objective: (11.4) Solve Apps: Binomial: Find Prob of At Least/At Most x Successes

Solve the problem.

51) If 3 balls are drawn at random from a bag containing 3 red and 4 blue balls, what is the expected number of red balls in the sample?

A) 1.39

B) 1.29

C) 0.89

D) 1.54

Objective: (11.5) Solve Apps: Expected Value

- 52) Suppose a charitable organization decides to raise money by raffling a trip worth \$500. If 3,000 tickets are sold at \$1.00 each, find the expected net winnings for a person who buys 1 ticket.
- A) $-\$0.83$ B) $-\$0.81$ C) $-\$0.85$ D) $-\$1.00$

Objective: (11.5) Solve Apps: Expected Winnings

- 53) Ten thousand raffle tickets are sold. One first prize of \$1400, 3 second prizes of \$800 each, and 9 third prizes of \$400 each are to be awarded, with all winners selected randomly. If you purchase one ticket, what are your expected winnings?
- A) 74 cents B) 98 cents C) 26 cents D) 102 cents

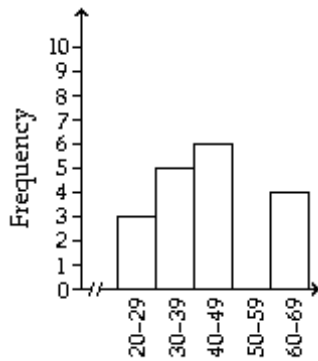
Objective: (11.5) Solve Apps: Expected Winnings

Construct the specified histogram.

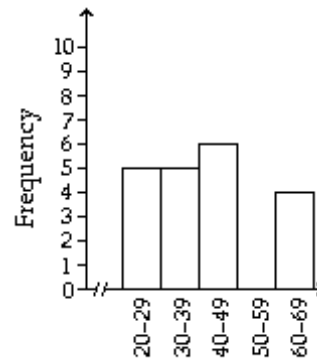
- 54) The ages of the voters at a poll during a 20-minute period are listed below. Use five classes with a uniform width of 10 years, where the lower limit of the first class is 20 years.

35 29 48 63 64 38 21 23 41 68
61 42 43 47 33 37 46 27 23 30

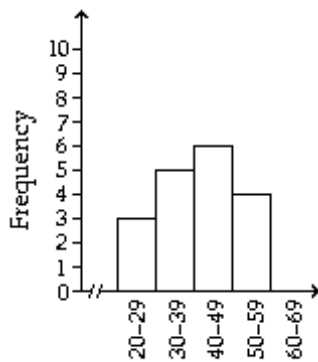
A)



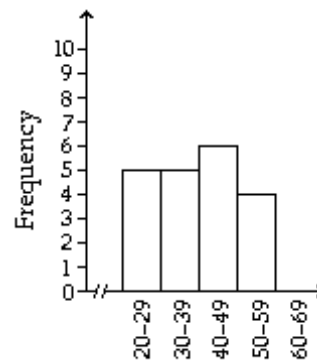
B)



C)



D)



Objective: (12.1) *Construct Histogram

Construct a stem and leaf display for given data.

55) The ages of the instructors at a local college are given below.

36 46 43 58
61 38 42 49
57 34 35 46
62 45 49 55

A)

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3|34 35 36 38
4|42 43 45 46 49
5|55 57 58
6|61 62
    
```

C)

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3|4 5 6 8
4|2 3 5 6 6 9 9
5|5 7 8
6|1 2
    
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B)

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3|34 35 36 38
4|42 43 45 46 46 49 49
5|55 57 58
6|61 62
    
```

D)

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3|4 5 6 8
4|2 3 5 6 9
5|5 7 8
6|1 2
    
```

Objective: (12.1) Construct Stem and Leaf Display

Use the given data to construct a frequency and relative frequency distribution.

56) On a math test, the scores of 24 students were

97 74 77 68 77 77 97 89 77 64 87 74
74 87 77 74 87 77 74 89 74 87 89 68

Construct a frequency and relative frequency distribution. Use 4 classes beginning with a lower class limit of 60.

A)

Score x	Frequency f	Relative Frequency f/n
60-69	3	$3/24 \approx 13\%$
70-79	11	$11/24 \approx 46\%$
80-89	8	$8/24 \approx 33\%$
90-99	2	$2/24 \approx 8\%$

C)

Score x	Frequency f	Relative Frequency f/n
60-69	3	$3/100 = 3\%$
70-79	12	$12/100 = 12\%$
80-89	7	$7/100 = 7\%$
90-99	2	$2/100 = 2\%$

B)

Score x	Frequency f	Relative Frequency f/n
60-70	3	$3/24 \approx 13\%$
70-80	12	$12/24 = 50\%$
80-90	7	$7/24 \approx 29\%$
90-100	2	$2/24 \approx 8\%$

D)

Score x	Frequency f	Relative Frequency f/n
60-69	3	$3/24 \approx 13\%$
70-79	12	$12/24 = 50\%$
80-89	7	$7/24 \approx 29\%$
90-99	2	$2/24 \approx 8\%$

Objective: (12.1) Construct Frequency and Relative Frequency Distribution

Find the mean, median, mode and range.

57) 41, 14, 7, 7, 28, 13, 27, 32, 33, 31

Objective: (12.2) Find Median of Data Set

Find the mean, median, mode, and range for the given frequency distribution.

Value	Frequency
20	4
30	6
40	5
50	3
80	1

Objective: (12.2) Find Median Given Frequency Distribution

Find the range and standard deviation. Round to one more place than the data.

59) 7, 5, 16, 16, 18, 5, 17, 17, 16

Objective: (12.3) Find Standard Deviation

60)

Temp. °F	Days
70	9
71	18
72	16
73	12
74	2

Objective: (12.3) Find Standard Deviation

Solve the problem.

- 61) Martin scored 41 points on a quiz. The average score for his class was 39 with a standard deviation of 2.4. Martin's brother Jeff who is in a different class also had a quiz. He scored 30. The average score in Jeff's class was 26 with a standard deviation of 1.9. Find the z-score for each person. Relatively speaking, who did better?
- A) 2.0, 4.0, Martin B) 2.0, 4.0, Jeff C) 0.83, 2.11, Martin D) 0.83, 2.11, Jeff

Objective: (12.4) Solve Apps: Z-Scores

- 62) Which score has the better relative position: a score of 52 on a test for which the mean is 43 and the standard deviation is 10, a score of 3.3 on a test for which the mean is 2.6 and the standard deviation is 0.7 or a score of 356.2 on a test for which the mean is 337 and the standard deviation is 48?
- A) The scores have the same relative position. B) A score of 52
C) A score of 356.2 D) A score of 3.3

Objective: (12.4) Solve Apps: Z-Scores

Find the indicated decile or percentile.

63) The test scores of 19 students are listed below. Find the sixth decile, D_6 .

36 45 49 53 55
56 59 61 62 65
68 70 74 78 84
88 91 92 99

- A) 70 B) 65 C) 68 D) 74

Objective: (12.4) Solve Apps: Percentiles/Deciles

64) The test scores of 19 students are listed below. Find the ninth decile, D_9 .

36 45 49 53 55
 56 59 61 62 65
 66 72 74 80 81
 88 90 94 96

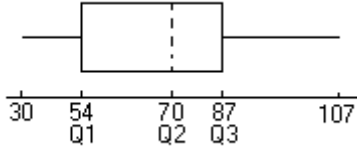
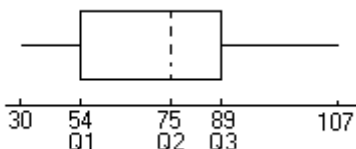
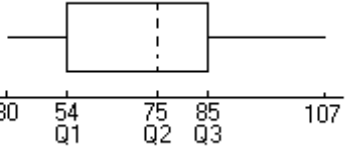
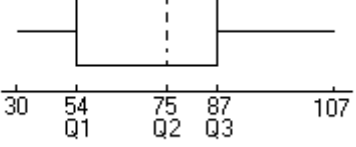
- A) 96 B) 45 C) 94 D) 90

Objective: (12.4) Solve Apps: Percentiles/Deciles

Solve.

65) Construct a box plot from the data below.

30 35 38 39 50
 51 54 54 51 63
 65 66 69 70 73
 77 80 81 81 83
 85 87 89 90 93
 93 95 97 99 107

- A)  B) 
- C)  D) 

Objective: (12.4) Solve Apps: Construct Box Plot

Find the indicated probability or percentage for the normally distributed variable.

66) The monthly incomes of trainees at a local mill are normally distributed with a mean of \$1100 and a standard deviation of \$150.

Find the probability that a randomly selected trainee earns less than \$900 a month.

- A) 0.159 B) 0.092 C) 0.081 D) 0.184

Objective: (12.5) Solve Apps: Use Normal Curve III

67) The mean weekly income of teachers in one state is \$390 with a standard deviation of \$45. The incomes are approximately normally distributed. What is the probability that a randomly selected teacher earns more than \$425 a week?

- A) 0.215 B) 0.218 C) 0.099 D) 0.782

Objective: (12.5) Solve Apps: Use Normal Curve III

- 68) A bank's loan officer rates applicants for credit. The ratings are normally distributed with a mean of 200 and a standard deviation of 50. If an applicant is randomly selected, find the probability of a rating that is between 170 and 220.
- A) 0.071 B) 0.155 C) 0.226 D) 0.381

Objective: (12.5) Solve Apps: Use Normal Curve III

Use the regression line to predict the value of y .

- 69) Nine pairs of data yield the regression equation $y' = 19.4 + 0.93x$. What is the best predicted value of y for $x = 59$?
- A) 74.3 B) 57.8 C) 64.7 D) 79.6

Objective: (12.6) Use Regression Line to Make Predictions

- 70) The regression equation relating dexterity scores (x) and productivity scores (y) for the employees of a company is $y' = 5.50 + 1.91x$. Ten pairs of data were used to obtain the equation. What is the predicted productivity score for a person whose dexterity score is 26?
- A) 56.3 B) 144.9 C) 55.2 D) 58.2

Objective: (12.6) Use Regression Line to Make Predictions