Exam #3 Review

13.2

Use the complement formula to answer the question.

1) If two fair dice are rolled, what is the probability that a total showing is more than three?

2) If nine fair coins are tossed, what is the probability of obtaining at least one head and at least one tail ?

3) The table gives information about the high temperature in Bristol, Wisconsin for the 365 days in a given year.

High Temp in °F	Number of Days During the Year
-30 to -11	2
-10 to 9	30
10 to 29	55
30 to 49	69
50 to 69	79
70 to 89	108
90 to 109	22

If we select one day at random from the 365 days in that year, what is the probability that the high temperature t was less than 70° F? Round your answer to 2 decimal places.

Solve the problem.

4) If two fair dice are rolled, what is the probability that a total showing is either even or less than five?

5) If a single card is drawn from a standard 52-card deck, what is the probability that it is either a six or a diamond?

Find the requested probability.

6) If $P(A \cup B) = 0.64$, $P(A) = 0.39$, and $P(A \cap B) = 0.17$, find $P(B)$.

7) If $P(A \cup B) = 0.63$, $P(B) = 0.45$, and $P(A \cap B) = 0.13$, find $P(A)$.

Solve the problem.

8) Bob earns both a salary and a commission as a salesman at an auto dealership. The following table lists his estimates of the probabilities of earning various commissions for next month:

Commission	Probability that this will happen
Less than $500	0.11
$500 - $999	0.23
$1000- $1499	0.28
$1500- $1999	0.17
$2000- $2499	0.12
$2500- $2999	0.07
$3000- $3499	0.02

What is the probability that he will earn no more than $1999 in commissions?

9) For a school project, Sue interviewed a total of 100 persons who were either lawyers or salesmen. She asked them if they were happy or unhappy with their occupation. Of the 59 lawyers interviewed, 14 were unhappy, however, only 9 of the salesmen were unhappy. Suppose that one of the persons interviewed is selected at random. Find the probability that the person selected is happy.

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Find the indicated probability.

10) A box contains 22 blue marbles, 16 green marbles, and 12 red marbles. Two marbles are selected at random without replacement. Let E be the event that the first marble selected is green. Let F be the event that the second marble selected is green. Find $P(F|E)$.

11) A single card is drawn from a standard 52-card deck. Find P(diamond | red).

12) The following table relates the grades in an advanced mathematics course to the student's year in college:

	A	B	C	D	E	Totals (%)
Freshmen	1	5	6	4	1	17
Sophomores	6	5	8	2	3	24
Juniors	5	7	12	6	2	32
Seniors	5	4	1	3	5	18
Grad Students	5	2	2	0	0	9
Totals (%)	22	23	29	15	11	100

Let E be the event that the student received a grade of B. Let F be the event that the student is a sophomore. Find

Imagine that you are taking part in a study to test a new cold medicine. Although you don't know exactly what drug you are taking, the probability that it is drug A is 30%, that it is drug B is 10%, and that it is drug C, 60%. From past clinical trials, the probabilities that these drugs will improve your condition are: A (20%), B (50%), and C (70%).

13) If you improve, what is the probability that you are taking drug A?

14) What is the probability that you don't improve?

15) What is the probability that you will improve given that you are taking drug B?

16) If you improve, what is the probability that you are taking drug C?

Solve the problem.

17) If a single fair die is rolled, find the probability of a 5 given that the number rolled is odd.

18) If two fair dice are rolled, find the probability of a "double" given that the sum is 11.

19) If two cards are drawn without replacement from a deck, find the probability that the second card is a face card, given that the first card was a queen.

Answer the question.

20) A pair of fair dice are rolled. Let E be the event that the sum is less than ten. Let F be the event that at least one die shows a six. Are E and F dependent events?

21) A pair of fair dice are rolled. Let E be the event that a one shows on the second die. Let F be the event that the total showing is even. Are E and F dependent events?

Solve the problem.

22) Of the coffee makers sold in an appliance store, 3% have either a faulty switch or a defective cord, 1.7% have a faulty switch, and 0.1% have both defects. What is the probability that a coffee maker will have a defective cord given that it has either a faulty switch or defective cord? Give results to the nearest tenth of a percent.

3.4

Identify the form of the argument and state whether the argument is valid or invalid.

23) If I'm hungry, then I will eat.
I'm not hungry.
Therefore, I will not eat.

24) You get soup or you get salad.
You did not get soup.
Therefore, you got salad.

Identify the form of the argument and state whether the argument is valid or invalid.

25) If you read, then you will have a high score.
You do not read.
Therefore, you will not have a high score.

26) If you wear a tie, then you look natty.
You do not look natty.
Therefore, you are not wearing a tie.

Determine whether the form represents a valid argument.

27) p
$\sim q \rightarrow \sim p$
$\sim p \wedge q$

28) r
$r \rightarrow p$
$(p \vee r) \rightarrow q$
$\sim p$

29) r
$q \rightarrow \sim r$
$\sim r \wedge p$
p

Determine whether the argument is valid or invalid.

30) If the pond contains algae, then the pond does not contain trout.
If the pond does not contain algae and does not contain trout, then the pond does not contain frogs.
The pond contains algae.
Therefore, the pond contains frogs.

31) The boat has a new battery.
If the boat has a new battery, then you can go fishing by the bridge.
The boat does not have gasoline or you will not go fishing by the bridge.
Therefore, the boat has gasoline.

14.4

Solve the problem. Assume that the given distribution is normal.

32) Assume that a distribution has a mean of 20 and a standard deviation of 6. What percentage of the values in the distribution do we expect to fall between 14 and 20?

33) Assume that a distribution has a mean of 24 and a standard deviation of 7. What percentage of the values in the distribution do we expect to fall between 24 and 38?

Use a table to find the percentage of the area under the standard normal curve between the two values. Round your answer to the nearest tenth.

34) $z = 0$ and $z = 1.89$

35) $z = 0$ and $z = -2.62$

Use a table to find a z-score that fits the given conditions. Interpolate if necessary.

36) 22% of the area under the standard normal curve is below the score.

Find the missing value.

37) 61 = mean
6 = standard deviation
_____ = raw score
-0.77 = z-score

Solve the problem.

38) Assume that the distribution of wait times spent by women in a restroom line at a sporting event is 5.3 minutes with a standard deviation of 1.5 minutes. For this distribution, find a raw score that corresponds to a z-score of 2.2.

39) Assume that among the members of a men's gym, the distribution of body weights has a mean of 188 pounds and a standard deviation of 7. If 267 men belong to the gym, how many of them do you expect to be over 200 pounds?

7.1 and 7.2

Solve the equation by applying the rules for rewriting equations.

40) $\frac{1}{5}x + 3 = \frac{3}{10}x - 8$

41) $0.2x + 3 = 3x - 0.6$

Solve the equation for the specified variable.

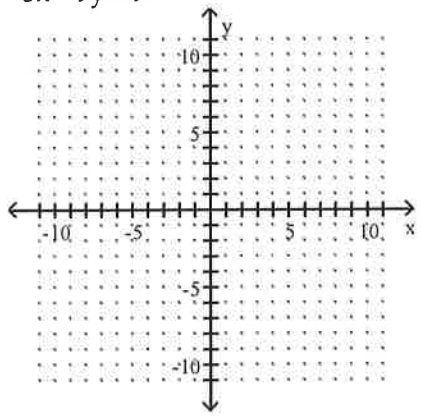
42) $I = \frac{nE}{nr + R}$ for n

43) $P = 2L + 2W$ for L

44) $A = P(1 + nr)$ for r

Find the x- and y-intercepts for the equation. Then graph the equation.

45) $-3x - 9y = 9$



Find the slope of the line passing through the two given points.

46) (-6, -7) and (-2, 8)

47) (-5, -5) and (3, 7)

Solve the problem.

48) A plumber charges a fixed rate plus an hourly rate to do house calls. The ordered pair (2, 65) indicates total charges of $65 for a job taking 2 hours, and the ordered pair (9, 170) indicates total charges of $170 for a job taking 9 hours.

a) Write a linear equation giving the total charges, y, in terms of the number of hours x.
b) Use the equation found in part a to find how much it costs for 4 hours.
c) How many hours would result in a total charge of $125?

Interpret the meaning of the slope and the y-intercept of the equation in terms of the conditions stated in the problem.

49) The value, in dollars, of a particular KX37B computer is given by $y = -425.15x + 5933$, where x is the number of years the computer has been in existence.

Solve the problem.

50) You are considering renting a car. The rental company, Save-U, charges a $146 base fee plus $26 per week, while another company, Cheap Car, charges a $104 base fee plus $33 per week. After how many weeks does the Save-U rental become the better deal?

51) A driver wants to gauge the fuel efficiency of her vehicle at speeds of 30 mph and above. She notices that traveling at an average speed of 40 mph results in a rating of 40 mpg, where as at an average speed of 50 mph, her car rates 35 mpg. Find an equation to model the gas mileage y for an average speed of x mph.

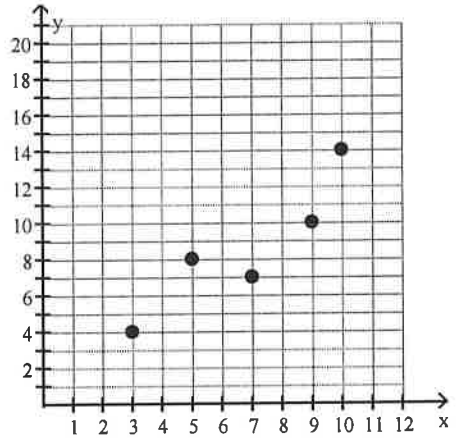
52) In 1984, the life expectancy for a female born in the United States was 75.7 years and was increasing at a rate of 0.25 years per year. Assume that this rate of increase remains constant. Using an appropriate linear equation as a model, estimate the life expectancy of a female born in the U.S. in 1998.

53) In 1994, there were 642,000 males enrolled in college who were between the ages of 18 and 22, and over the next several years this number increased at a rate of 56.5 thousand per year. Using an appropriate linear equation as a model, estimate the number of males enrolled in college in the year 2002.

14.5

State what kind of correlation, if any, the scatterplot indicates.

54)



Calculate the linear correlation coefficient.

55) (3, 4), (5, 8), (6, 7), (6, 8)

Find the line of best fit for the data.

56) (24, 15), (26, 13), (28, 20), (30, 16), (32, 24)

57) As a car begins to accelerate, the gas mileage is poor. As the speed increases, the gas mileage continues to increas gas mileage increases for a while, then as the speed increases further, the mileage begins to decrease. The table o below illustrates this.

Speed in Miles per Hour	Mileage in Miles per Gallon
30	25
40	30
50	31
60	30
70	28

Determine the linear correlation coefficient for the data .

58) The table below lists the average SAT score and teachers' salaries for five school districts.

District	SAT Score	Teacher Salary (in $thousands)
District 1	786	53
District 2	823	52
District 3	921	50
District 4	850	49
District 5	877	51

7.3

Solve the quadratic equation.

59) $x^2 + 12x + 36 = 0$

Solve the quadratic equation.

60) $x^2 + 2x - 35 = 0$

61) $5x^2 - 9x - 2 = 0$

Find the vertex of the quadratic equation's graph and determine whether the graph opens up or down.

62) $y = x^2 + 3x + 6$

63) $y = -x^2 + 4x - 12$

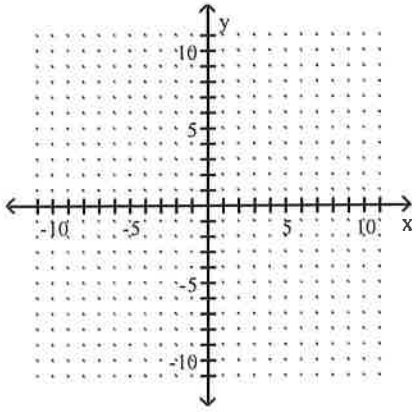
Find the x-intercepts and y-intercept of the graph of the given quadratic equation.

64) $y = 3x^2 + 9x - 12$

65) $y = -x^2 + 15x - 56$

Graph.

66) $y = x^2 + 2x - 6$



Solve the problem.

67) A projectile is thrown upward so that its distance, in feet, above the ground after t seconds is $h = -16t^2 + 608t$. What is its maximum height?

68) John owns a hotdog stand. He has found that his profit is represented by the equation $P = -x^2 + 58x + 77$, with P being the profit in dollars, and x the number of hotdogs sold. How many hotdogs must he sell to earn the most profit?

1) $\frac{11}{12}$
2) $\frac{255}{256}$
3) 0.64
4) $\frac{5}{9}$
5) $\frac{4}{13}$
6) 0.42
7) 0.31
8) 0.79
9) 0.77
10) $\frac{15}{49}$
11) $\frac{1}{2}$
12) $\frac{5}{23}$
13) 0.113
14) 0.47
15) 0.50
16) 0.792
17) $\frac{1}{3}$
18) 0
19) $\frac{11}{51}$
20) Yes
21) No
22) 0.467
23) Fallacy of the inverse; invalid
24) Disjunctive syllogism; valid
25) Fallacy of the inverse; invalid
26) Law of contraposition; valid
27) Invalid
28) Invalid
29) Valid
30) Invalid
31) Invalid
32) 34%
33) 47.5%
34) 47.1%
35) 49.6%
36) -0.77
37) 56.38
38) 8.6
39) About 11 or 12

40) 110

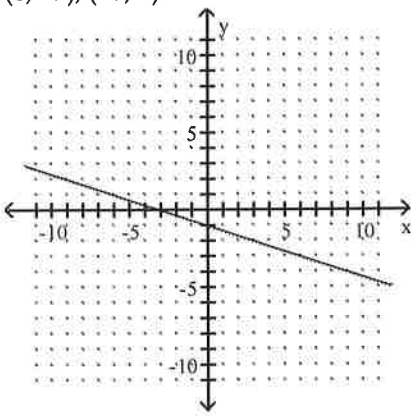
41) $\frac{9}{7}$

42) $n = \frac{-IR}{Ir - E}$

43) $L = \frac{P - 2W}{2}$

44) $r = \frac{A - P}{Pn}$

45) (0, -1), (-3, 0)



46) $\frac{15}{4}$

47) $\frac{3}{2}$

48) y = 15x + 35; $95; 6 hours

49) -425.15 signifies the amount of depreciation in one year, and 5933 signifies the initial cost.

50) 6

51) $y = -\frac{1}{2}x + 60$

52) 79.20 years

53) 1,094,000

54) positive correlation

55) 0.87

56) y = 1.05x - 11.8

57) y = 0.06x + 25.8

58) -0.69; neither

59) -6

60) -7, 5

61) $-\frac{1}{5}, 2$

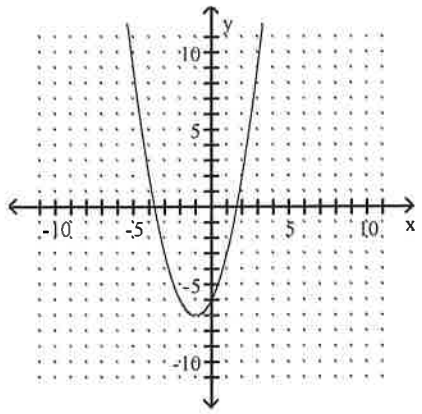
62) $\left(-\frac{3}{2}, \frac{15}{4}\right)$, up

63) (2, - 8), down

64) x-intercepts (1, 0) and (-4, 0); y-intercept (0, -12)

65) x-intercepts (7, 0) and (8, 0); y-intercept (0, -56)

66)



67) 5776 ft
68) 29 hotdogs