



# Chapter 1 Review

## 1.1

Solve these equations.

- $5(x - 1) + 3 = 4x - 7$
- $\frac{3}{2}x - 6 = \frac{2x + 1}{5}$
- $\frac{x - 9}{4} + 2 = \frac{x - 4}{3} + 3$
- $\frac{x}{x - 2} + 5 = 3 - \frac{4}{x - 2}$
- $\frac{2}{2x + 1} + \frac{3}{x - 5} = 0$
- $\frac{3x - 1}{x + 5} = \frac{9}{2}$
- $\frac{6 - x}{x + 2} = \frac{8}{5}$
- $\frac{2x + 1}{x - 2} + 4 = \frac{5}{x - 2}$
- Twenty more than five times a number is the same as seven times that same number. What is the number?
- A car sells for \$25,482.60 and this price includes 7.25% sales tax. How much is the sales tax?
- Find three consecutive even numbers whose sum is 72.

## 1.2

Solve the linear inequalities and graph the solutions on a real number line.

- $\frac{1}{3}x - 4 \geq 1$
- $\frac{1}{4}x + 5 \leq \frac{1}{3}x + 1$
- $\frac{5x + 2}{4} - 1 \leq \frac{x + 3}{6} + 1$
- $-1 \leq 2x + 3 < 5$
- $\frac{5}{3}(2w + 4) < 25 + 5w$
- $\frac{1}{2}(8x - 12) + 5 < \frac{-1}{3}(18x - 6)$
- Malik scored 69, 78, 85 and 71 (out of a possible 100 points) on the four midterm exams for a math class. If the three highest scoring exams each count as 20% of the total grade, the lowest exam counts as only 10% of the total grade, and the final exam counts as 30% of the total grade, what must Malik score on the final exam to get at least 75% as the overall grade in the class?
- Jaleigh invests a total of \$10,000 in two different accounts. The riskier investment yields an annual average of 11% profit and the safer investment typically yields 6% profit annually. How much money should be invested in the safer account if Jaleigh needs at least \$850 profit per year?

## 1.3

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

20.  $(-5, 3)$  and  $(1, 1)$

21.  $(4, 2)$  and  $(-3, 2)$

22.  $(1, 9)$  and  $(1, 0)$

Write the equation of the line, in slope-intercept form, given two pieces of information about the line.

23.  $m = 3$ , goes through the point  $(-2, 5)$

24. goes through the points  $(-1, 7)$  and  $(2, 1)$

25. goes through the point  $(4, 0)$  and is parallel to the line  $2x + 4y = 5$

26. goes through the point  $(3, -6)$  and is perpendicular to the line  $x - 5y = 9$

27. goes through the point  $(10, 8)$  and has undefined slope

28. The plumber, Paul, charged Ann a flat fee of \$20 just to come to her house. Then, his hourly labor rate was \$45, prorated for parts of hours. If he was there for 45 minutes, how much was her plumbing bill?

## 1.4

Solve these systems of equations.

29.  $2x + 5y = 7$   
 $x - 3y = -2$

30.  $\frac{1}{3}x + 5y = -1$   
 $2x - \frac{1}{2}y = -6$

31.  $4x - y = -1$   
 $5x + y = 19$

32.  $10x - 4y = 3$

$\frac{5}{2}x - y = 1$

33.  $-3x + y = 9$   
 $6x - 2y = -18$

34.  $5x + 4y = 1$   
 $-15x - 12y = 0$

35.  $2x - 3y = 2$   
 $5x + 6y = \frac{1}{2}$

36.  $-\frac{3}{2}x + \frac{5}{2}y = 4$   
 $9x - 15y = -24$

37.  $-x + y + 2z = -2$   
 $5y = 15$   
 $3x - 4y + z = 3$

38.  $x + y + z = 3$   
 $3x - 2y = -1$   
 $2z = -6$

39. At Leslie's Party Store, you can purchase fancy party hats for \$1.50 each and party favors for \$0.80 each. Carmen spent \$104.50 for a total of 100 items, including only the party hats and party favors. How many party hats and how many party favors did Carmen purchase?

## 1.5

Indicate whether or not the relation represents a function. If it is a function, find the domain.

40.  $3x^2 + 4y^2 = 1$

41.  $y = \frac{2x}{(x-5)(2x+1)}$

42.  $y = (3 + x^2)\sqrt{x+5}$

43.  $y = \frac{18}{\sqrt{x-4}}$

Evaluate each function at the given input values.

44.  $f(x) = 2x^2 - 4x + 1$

a.  $f(3)$

b.  $f(h)$

45.  $g(p) = \frac{9}{\sqrt{3p+2}}$

a.  $g(0)$

b.  $g(w+1)$

46.  $h(x) = \frac{2x+1}{x-8}$

a.  $h(4)$

b.  $h(x^2)$

47.  $f(y) = \sqrt{2-y} + \sqrt{y+1}$

a.  $f(2)$

b.  $f(y+h)$

48.  $\gamma(x) = \sqrt{x^2 - 4}$

a.  $\gamma(3)$

b.  $\gamma(x^2 + 1)$

## 1.6

49. Find the market equilibrium point given a demand equation of  $2p + 3q = 492$  and a supply equation of  $p - 3q = -429$ .
50. Van's Furniture Store sells a popular rocking chair. They've discovered, through market analysis, that the demand equation is  $2p + q = 740$  for this chair, and their supply equation is  $p = 2q - 530$ . Given this information, what price should they charge for a rocking chair? How many chairs will they sell at this price?
51. Mohomodou is thinking of starting a business selling t-shirts with inspirational quotes on them. His target consumer group is comprised of wealthy clients, including celebrities. After some market research, he finds the consumers will buy 180 t-shirts if the price is \$42 and will buy 200 t-shirts for a price of \$26. He's willing to supply t-shirts according to the equation  $\frac{1}{3}p + 204 = q$ .
- How many t-shirts will he sell if he prices each t-shirt at \$25?
  - What price must he charge to sell 230 shirts?
  - What is the market equilibrium point?
52. The demand for Ki's chocolate truffles, during the winter holiday season, is 400 when the cost is \$1.50 each, but demand goes up to 800 when the cost is only \$1 each. Assuming the demand equation is linear, find the demand equation. At what price would consumers be willing to buy 1000 of Ki's truffles?
53. Given a cost equation of  $C = 18x + 10800$  and a revenue equation of  $R = 45x$ , where  $x$  is the quantity of books made and sold, how many books should be sold to break even? What is the cost of creating that many books? What is the revenue from selling those books?
54. In her retirement, my mother decided to sell her homemade jellies. Her fixed costs are \$250 per month and it costs an additional \$1.25, on average, to produce one jar of jelly. She can sell each jar for \$4.50. How many jars of jelly must she sell to break even? What will her profit be if she sells 150 jars this month? What will her profit be if she sells 300 jars of jelly?

55. Alkira realized there is a great need for helping students overcome their fear of mathematics. She's decided to go into business offering workshops to help students overcome this fear and fulfill this need. Her fixed costs will be \$540, according to her calculations, and materials will cost \$40 per attendee. She's planning on charging \$95 per student for participating in her workshop. How many students must sign up for the workshop for Alkira to break even? She wants to keep the workshop enrollment to a maximum of 30 students. If it has a maximum capacity, what is Alkira's profit for the workshop?
56. For a cost equation given by  $C = 3x + 310$  and a revenue equation of  $R = 6.5x$ , answer the following questions.
- What is the profit equation?
  - What is the equilibrium point?

## 1.7

*Graph the solution set of each of these systems of inequalities.*

57.  $x \geq 0, y \geq 0$   
 $3x + 2y \leq 20$   
 $x - y \leq 5$
58.  $3y - 5x \leq 15$   
 $4y - 20 \leq -7x$   
 $2x + 7y \geq -6$
59.  $x \geq 2$   
 $x \leq 6$   
 $y \leq x + 1$   
 $5x + 4y \geq 10$
60.  $y \geq x - 4$   
 $5y \leq 4x + 8$   
 $5x - y \leq 32$   
 $3x + 2y \geq 17$
61.  $3y + 2x \geq -6$   
 $3x + y \geq 5$   
 $3y \leq 5x + 15$
62. A Bikram yoga studio charges \$10 per class for adults and only \$6 per class for students. The studio can hold a maximum of 65 students for a class. The owner wants to bring in revenue of at least \$590 for a special New Year's Eve class. Graph the possible solution set, providing also the system of inequalities for that solution set.

## 1.8

*Find both the maximum and minimum of the objective function,  $f$ , given the inequality constraints on  $x$  and  $y$ .*

63.  $f = -2x + 5y$   
 $y \leq 8$   
 $6y - 5x \geq 8$   
 $2y \geq -5x + 16$
64.  $f = 3x + y$   
 $x \geq 0, y \geq 0$   
 $7x + 3y \leq 21$   
 $9y \leq -4x + 36$
65.  $f = 5x - 2y$   
 $3y \leq -8x + 24$   
 $4x - 3y \leq 12$   
 $5y \leq 8x + 40$   
 $-5y \leq 4x + 20$
66. (Refer to problem 62.) If the yoga studio owner has a profit equation of  $P = 5x + 2y$ , where  $x$  is the number of adult participants and  $y$  is the number of student participants, what is the maximum profit for the special New Year's Eve class? How many adult and student participants create that maximum profit?