Section 2.2

In Exercises 7-12, give the constant term and the coefficient of x for each of the linear expressions.

7. 3x+4

8. 5x−x+5

9. w+wx+1

10. x+rx

11. mx+mn+5x+m+7

12. 5−2(x+4)+6(2x+1) **8.**

18, When n guests are staying in a room, where n≥2, the Happy Place Hotel charges, in dollars, C(n)=79+10(n−2).

What is the practical meaning of the 79 and the 10?

19. A salesperson receives a weekly salary plus a commission when the weekly sales exceed $1000.
 The person's total income in dollars for weekly sales of s dollars (where s≥1000) is given by
T(s)=600+0.15(s−1000).   What is the practical meaning of the 600 and the 0.15?

20. Ashley receives an MP3 player as a gift. The number of songs in her collection t months after receiving the MP3 player is given by
C(t)=500+19(t−24).

(a) What is the practical interpretation of the constants 24 and 500 in the expression for C?

(b) Express C(t) in slope-intercept form and interpret the slope and intercept.

21. A company's profit after t months of operation is given by P(t)=1000+500(t−4).

(a) What is the practical meaning of the constants 4 and 1000?

(b) Rewrite the function in slope-intercept form and give a practical interpretation of the constants.

22. After t hours, Liza's distance from home, in miles, is given by D(t)=138+40(t−3).

(a) What is the practical interpretation of the constants 3 and 138?

(b) Rewrite the function in slope-intercept form and give a practical interpretation of the constants.

Section 2.3

1. The tuition cost for part-time students taking C credits at Stonewall College is given by 300+200C dollars.

(a) Find the tuition cost for eight credits.

(b) If the tuition cost is $1700, how many credits are taken?

2. A car's value t years after it is purchased is given by V(t)=18,000−1700t. How long does it take for the car's value to drop to $2000?

3. For the function

f(t) = 2t+35,

(a) Evaluate f(11)

(b) Solve f(t)=2.

4. Without solving, explain why the following equation has infinitely many solutions:

$4x-12=4(x-3)$.

5. Without solving, explain why the following equation has no solutions:

$3x+2(x-5)=3x+2(x-5)+7$

6. Let a be a constant. Explain why the equation

$5+a(x-2)=5+a(x-2)+3x$

has only one solution for x. What is this solution?

7. Explain why the equation

$2(x+1) = -2(x+1)$

has only one solution. What is this solution?

■ In Exercises 8-14, does the equation have no solution, one solution, or an infinite number of solutions?

8. $4x+3=7$

9. $4x+3=-7$

10. $4x+3=4(x+1)-1$

11. $4x+3=4(x+1)+1$

12. $4x+3=3$

13. $4x+3=4(x-1)+5$

14. $4x+3=4(x-1)+7$

15. Without solving the equation, explain why the solution of the equation $74 + 0.13x = 109$ must be positive.

16. Without solving the equation, explain why the solution of the equation $5(84+x)=16$ must be negative.

17. Let a be a positive constant. Without solving the equation, explain why the solution x of the equation $ax=4a+3$ must be positive.

■ Without solving them, say whether the equations in Exercises 18-29 have a positive solution, a negative solution, a zero solution, or no solution.

Give a reason for your answer.

18. $3x=5$

19. $3a+7=5$

20. $5z+7=3$

21. $3u-7=5$

22. $7-5w=3$

23. $4y=9y$

24. $4b=9b+6$

25. $6p=9p-4$

26. $8r+3=2r+11$

27. $8+3t=2+11t$

28. $2-11c=8-3c$

29. 8d+3=11d+3

■ In Problems 30-34, a company offers three formulas for the weekly salary of its sales people, depending on the number of sales, s, made each week:
- **(a)** 100+0.10s dollars
- **(b)** 150+0.05s dollars
- **(c)** 175 dollars

30. How many sales must be made under option (a) to receive $200 a week?

31. How many sales must be made under option (c) to receive $200 a week?

32. At what sales level do options (a) and (b) produce the same salary?

33. At what sales level do options (b) and (c) produce the same salary?

34. At what sales level do options (a) and (c) produce the same salary?

■ Solve the equations in Problems 35-42.

A car rental company charges $37 per day and $0.25 per mile.

(a)

Compute the cost of renting the car for one day, assuming the car is driven 100 miles.

(b)

Compute the cost of renting the car for three days, assuming the car is driven 400 miles.

(c)

Andy rented a car for five days, but he did not keep track of how many miles he drove. He gets a bill for $385. How many miles did he drive?

45. Find a possible formula for the linear function y=g(x) given that:

- •The value of the expression g(100) is 30, and
- •The solution to the equation g(x)=15 is −50.

46. Write the formula for two linear functions whose graphs do not intersect. Change one of the formulas so that the graphs do intersect.

47. The floor plan for a room is shown in Figure <u>2.12</u>. The total area is 144 ft2. What is the missing length?
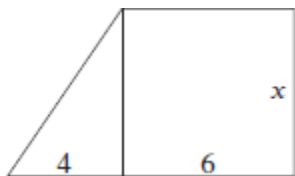

Figure 2.12   Not drawn to scale

48. The cost of a house in Happy Acres requires a down payment of $75,000 and monthly payments of $2000. A similar house in

Friendly Fields needs a $50,000 down payment and monthly payments of $2200. Write an equation for the cost of each house over time.

When will the cost of the Friendly Fields house surpass the cost of the Happy Acres house?

49. Two companies sell and deliver sand used as a base for building patios. Company A charges $10 a cubic yard and a flat $40 delivery

fee for any amount of sand up to 12 cubic yards. Company B charges $8 a cubic yard and a flat $50 delivery fee for any amount of sand

up to 12 cubic yards. You wish to have x cubic yards of sand delivered, where $0<x\leq12$. When will the two companies be charging the same amount?

50. You have a coupon worth $20 off the purchase of a scientific calculator. At the same time the calculator is offered with a discount of 20%,

and no further discounts apply. For what tag price on the calculator do you pay the same amount for each discount?

51. You drive 100 miles. Over the first 50 miles you drive 50 mph, and over the second 50 miles you drive V mph.

(a) Calculate the time spent on the first 50 miles and on the second 50 miles.

(b) Calculate the average speed for the entire 100 mile journey.

(c) If you want to average 75 mph for the entire journey, what is V?

(d) If you want to average 100 mph for the entire journey, what is V?

67. A software developer charges $p/hour to write a custom smartphone app, plus $2500 to set up a small

website for hosting it. Find p if an app that takes h hours to write costs $10,500.

68. A lawyer charges $p per hour to write a legal document, plus $750 for an initial consultation.

Find n, the number of hours, if the total cost is $2950.

69. A flask containing n moles of helium is being held at a temperature of T Kelvins. If the volume of the flask is V liters,

the pressure that the gas exerts on the flask, in atmospheres, is given by

P=nRTV,where R is a positive constant. How many moles of helium must be stored in the flask in order to produce a pressure of 3 atmospheres?

70. The surface area of a right circular cylinder having radius r cm and height h cm is given by

$$2\pi r^2+2\pi rh$$

square centimeters. Find the height of a cylinder having a surface area of 400 square centimeters.

Section 2.4
DENTIFYING ALGEBRAIC STRUCTURE

1. The following equations all represent the same line:

y=1.5x−10.   5y=6+1.5(x−11)   3x−2y=21

For each of the following questions, decide which equation is most useful for answering the question, and answer it.

(a) What is the y-intercept of the line?

(b) What is the slope of the line?

(c) What is the x-intercept of the line?

(d) What is the value of y when x=11?

2. The following equations all represent the same line:

$$y = 3 - \tfrac{1}{2}(x-5) \qquad\qquad y = \tfrac{11}{2} - \tfrac{1}{2}x \qquad\qquad x + 2y = 11$$

For each of the following questions, decide which equation is most useful for answering the question, and answer it.

(a) The slope of the line.

(b) The y-intercept of the line.

(c) The x-intercept of the line.

(d) The value of y when $x = 5$.