Name _____ Date _____

Is It Getting Hot in Here?
Modeling Data Using Linear Regression

Vocabulary

Choose the term that best completes each sentence.

linear regression	line of best fit	linear regression equation
significant digits	correlation coefficient	

1. The equation that describes a line of best fit is called a _____.
2. Decimal digits that carry meaning contributing to a number's precision are _____.
3. _____ models the relationship between two variables in a data set by producing a line of best fit.
4. A _____ is a line that best approximates the linear relationship between two variables in a data set.
5. The _____ indicates how closely data points are to forming a straight line.

Problem Set

Use your calculator to determine the linear regression equation and the correlation coefficient for each given set of data. Then use the equation to make the prediction.

1. The table shows the attendance for the varsity football games at Pedro's high school. Predict the attendance for Game 9.

Game	Attendance
1	2000
2	2132
3	2198
4	2301
5	2285
6	2401

$f(x) = 73x + 1963$, $r \approx 0.9694$

Game 1 is represented by $x = 1$, so Game 9 is represented by $x = 9$.

$f(x) = 73x + 1963$

$f(9) = 73(9) + 1963$

$f(9) = 2620$

The attendance during Game 9 will be 2620 people.

Name _____ Date _____

2. The table shows the attendance for the annual spring concert at Eva's high school for 6 years. Predict the attendance in 2016.

Year	Attendance
2007	789
2008	805
2009	773
2010	852
2011	884
2012	902

3. The table shows the average gas price for 6 months. Predict the average gas price for August.

Month	Price of Gas (dollars)
January	$3.15
February	$3.22
March	$3.19
April	$3.28
May	$3.35
June	$3.32

Name _____ Date _____

4. The table shows monthly record sales of a recording artist over 6 months. Predict the record sales total for December.

Monthly	Record Sales (CDs)
January	60,000
February	54,000
March	58,000
April	46,000
May	43,000
June	30,000

5. The table shows the number of miles Kata traveled for work each year for 6 years. Predict the number of miles Kata will travel in 2014.

Year	Miles Traveled
2006	8300
2007	7550
2008	8005
2009	7600
2010	6935
2011	6405

Name _____ Date _____

6. The table shows the number of songs downloaded for a recording artist over 6 months. Predict the number of songs that will be downloaded in November.

Month	Songs Downloaded
January	15,302
February	16,783
March	18,204
April	17,899
May	20,345
June	24,980

3

Name _____ Date _____

Tickets for Sale
Standard Form of Linear Equations

Vocabulary

Define each term in your own words.

1. standard form

2. slope-intercept form

Problem Set

Define variables and write an expression to represent each situation.

1. A farmer's market sells apples for \$0.75 per pound and oranges for \$0.89 per pound. Write an expression to represent the total amount the farmer's market can earn selling apples and oranges.

   a = pounds of apples

   b = pounds of oranges

   $0.75a + 0.89b$

2. A photo printing website sells 8×10 prints for \$4.99 and 3×5 prints for \$1.99. Write an expression to represent the total amount the website can earn selling 8×10 and 3×5 prints.

3. A movie theater sells tickets for matinee showings for \$7.00 and evening showings for \$10.50. Write an expression that represents the total amount the theater can earn selling tickets.

4. A bakery sells muffins for $1.25 each and scones for $1.75 each. Write an expression that represents the total amount the bakery can earn selling muffins and scones.

5. A florist sells daisies for $8.99 a dozen and roses for $15.99 a dozen. Write an expression that represents the total amount the florist can earn selling daisies and roses.

6. The hockey booster club is selling winter hats for $12 each and sweatshirts for $26 each. Write an expression that represents the total amount the booster club can earn selling hats and sweatshirts.

Define variables and write an equation to represent each situation.

7. A florist sells carnations for $10.99 a dozen and lilies for $12.99 a dozen. During a weekend sale, the florist's goal is to earn $650. Write an equation that represents the total amount the florist would like to earn selling carnations and lilies during the weekend sale.

c = carnations

f = lilies

$10.99c + 12.99f = 650$

8. A bakery sells bagels for $0.85 each and muffins for $1.10 each. The bakery hopes to earn $400 each day from these sales. Write an equation that represents the total amount the bakery would like to earn selling bagels and muffins each day.

9. A farmer's market sells oranges for $0.79 per pound and peaches for $1.05 per pound. The farmer's market hopes to earn $325 each day from these sales. Write an equation to represent the total amount the farmer's market would like to earn selling oranges and peaches each day.

Name _____ Date _____

10. The high school soccer booster club sells tickets to the varsity matches for $4 for students and $8 for adults. The booster club hopes to earn $200 at each match. Write an equation to represent the total amount the booster club would like to earn from ticket sales at each match.

11. An electronics store sells DVDs for $15.99 and Blu-ray discs for $22.99. The store hopes to earn $2000 each week from these sales. Write an equation to represent the total amount the store would like to earn each week.

12. Ling is selling jewelry at a craft fair. She sells earrings for $5 each and bracelets for $7 each. She hopes to earn $300 during the fair. Write an equation to represent the total amount Ling would like to earn during the fair.

The basketball booster club runs the concession stand during a weekend tournament. They sell hamburgers for $2.50 each and hot dogs for $1.50 each. They hope to earn $900 during the tournament. The equation $2.50b + 1.50h = 900$ represents the total amount the booster club hopes to earn. Use this equation to determine each unknown value.

13. If the booster club sells 315 hamburgers during the tournament, how many hot dogs must they sell to reach their goal?

$$2.50b + 1.50h = 900$$
$$2.50(315) + 1.50h = 900$$
$$787.50 + 1.50h = 900$$
$$1.50h = 112.50$$
$$h = 75$$

The booster club must sell 75 hot dogs to reach their goal.

14. If the booster club sells 420 hot dogs during the tournament, how many hamburgers must they sell to reach their goal?

15. If the booster club sells 0 hot dogs during the tournament, how many hamburgers must they sell to reach their goal?

16. If the booster club sells 0 hamburgers during the tournament, how many hot dogs must they sell to reach their goal?

17. If the booster club sells 281 hamburgers during the tournament, how many hot dogs must they sell to reach their goal?

Name _____ Date _____

18. If the booster club sells 168 hot dogs during the tournament, how many hamburgers must they sell to reach their goal?

Determine the *x*-intercept and the *y*-intercept of each equation.

19. $20x + 8y = 240$

$20x + 8y = 240$
$20x + 8(0) = 240$
$20x = 240$
$x = 12$

$20x + 8y = 240$
$20(0) + 8y = 240$
$8y = 240$
$y = 30$

The *x*-intercept is (12, 0) and the *y*-intercept is (0, 30).

20. $15x + 3y = 270$

21. $y = 8x + 168$

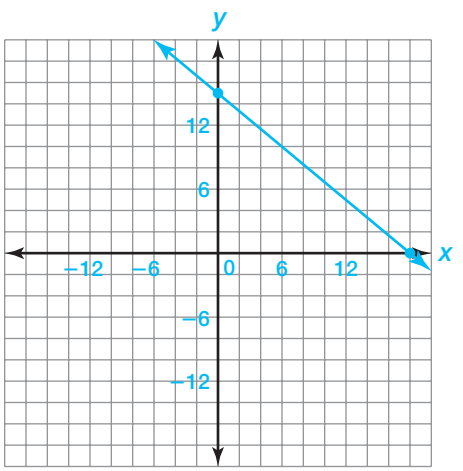
22. $y = -4x + 52$

23. $14x + 25y = 342$

24. $y = 6x + 291$

Determine the x-intercept and y-intercept. Then graph each equation.

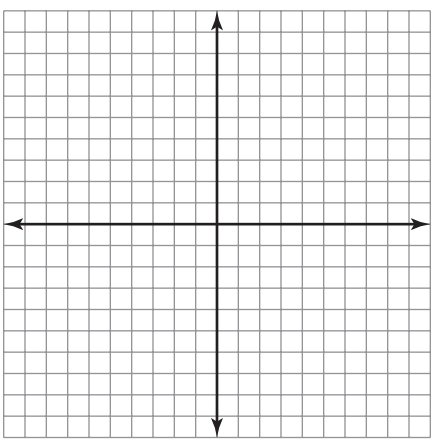
25. $5x + 6y = 90$



$5x + 6y = 90$
$5x + 6(0) = 90$
$5x = 90$
$x = 18$

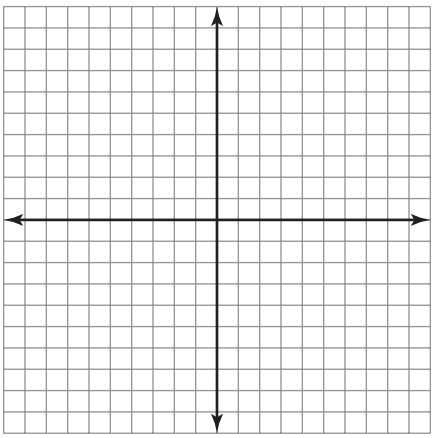
$5x + 6y = 90$
$5(0) + 6y = 90$
$6y = 90$
$y = 15$

26. $12x - 9y = 36$

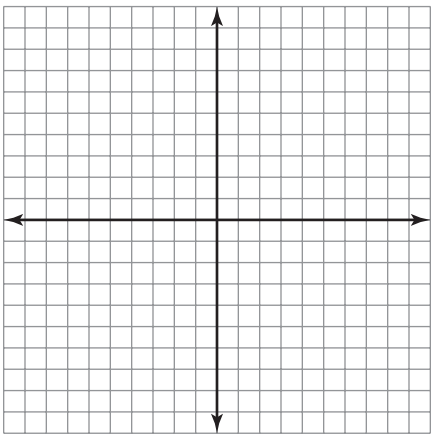


Name _____ Date _____

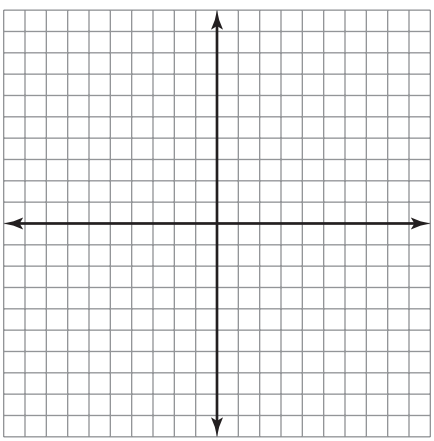
27. $y = 3x - 15$



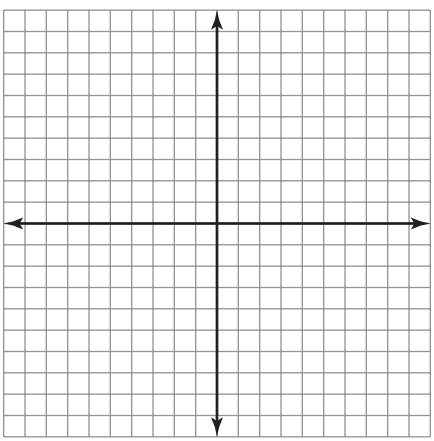
28. $y = -30x + 180$



29. $6x + 13y = 57$



30. $y = 3x - 41$



3

Name _____ Date _____

Cool As A Cucumber or Hot Like A Tamale!

Literal Equations in Standard Form and Slope-Intercept Form

Vocabulary

Define the term in your own words.

1. literal equations

Problem Set

Convert between degrees Fahrenheit and degrees Celsius using the literal equation given. If necessary, round the answer to the nearest hundredth.

$$C = \frac{5}{9}(F - 32)$$

1. 72°F

$C = \frac{5}{9}(F - 32)$

$C = \frac{5}{9}(72 - 32)$

$C = \frac{5}{9}(40)$

$C \approx 22.22$

$72°F \approx 22.22°C$

2. −11°F

3. 102.6°F

4. 25°C

5. 42°C

6. −3.4°C

Convert each equation from standard form to slope-intercept form.

7. $4x + 6y = 48$

$$4x + 6y = 48$$
$$4x - 4x + 6y = -4x + 48$$
$$\frac{6y}{6} = \frac{-4x + 48}{6}$$
$$y = -\frac{4}{6}x + 8$$
$$y = -\frac{2}{3}x + 8$$

8. $3x - 5y = 25$

9. $-4x + 9y = 45$

10. $6x - 2y = -52$

11. $-x - 8y = 96$

12. $12x + 28y = -84$

Name _____ Date _____

Convert each equation from slope-intercept form to standard form.

13. $y = 5x + 8$

$y = 5x + 8$

$-5x + y = 5x - 5x + 8$

$-5x + y = 8$

14. $y = -4x + 2$

15. $y = \frac{2}{3}x - 6$

16. $y = -\frac{1}{2}x - 3$

17. $y = -5x - 13$

18. $y = \frac{3}{4}x + 10$

Solve each equation for the variable indicated.

19. The formula for the area of a triangle is $A = \frac{1}{2}bh$. Solve the equation for h.

$$A = \frac{1}{2}bh$$
$$(2)A = 2\left(\frac{1}{2}bh\right)$$
$$2A = bh$$
$$\frac{2A}{b} = \frac{bh}{b}$$
$$\frac{2A}{b} = h$$

3

20. The formula for the area of a trapezoid is $A = \frac{1}{2}(b_1 + b_2)h$. Solve the equation for b_1.

21. The formula for the area of a circle is $A = \pi r^2$. Solve the equation for r.

Name _____ Date _____

22. The formula for the volume of a cylinder is $V = \pi r^2 h$. Solve the equation for h.

23. The formula for the volume of a pyramid is $V = \frac{1}{3}lwh$. Solve the equation for w.

24. The formula for the volume of a sphere is $V = \frac{4}{3}\pi r^3$. Solve the equation for r.

3

Name _____ Date _____

A Growing Business
Combining Linear Equations

Problem Set

Write a linear function in two different ways to represent each problem situation.

1. Mei paints and sells ceramic vases for $35 each. Each month she typically breaks 3 vases in the kiln. Write a linear function that represents the total amount Mei earns each month selling vases taking into account the value of the vases she breaks.

   $f(x) = 35(x - 3)$

   $f(x) = 35x - 105$

2. Isabel makes and sells fruit pies at her bakery for $12.99 each. Each month she gives away 4 pies as samples. Write a linear function that represents the total amount Isabel earns each month selling fruit pies taking into account the value of the pies she gives away as samples.

3. Mattie sells heads of lettuce for $1.99 each from a roadside farmer's market stand. Each week she loses 2 heads of lettuce due to spoilage. Write a linear function that represents the total amount Mattie earns each week selling heads of lettuce taking into account the value of the lettuce she loses due to spoilage.

4. Carlos prints and sells T-shirts for $14.99 each. Each month 5 T-shirts are misprinted and cannot be sold. Write a linear equation that represents the total amount Carlos earns each month selling T-shirts taking into account the value of the T-shirts that cannot be sold.

5. Odell prints and sells posters for $20 each. Each month 1 poster is misprinted and cannot be sold. Write a linear equation that represents the total amount Odell earns each month taking into account the value of the poster that cannot be sold.

6. Emilio builds and sells homemade wooden toys for $40 each. Each month he donates 3 toys to a children's hospital. Write a linear equation that represents the total amount Emilio earns each month selling toys taking into account the toys he donates.

Write a linear function to represent each problem situation.

7. A cereal manufacturer has two production lines. Line A produces a variety of cereal that is sold for $3 per box. Line A typically produces 4 boxes per day that do not meet company standards and cannot be sold. Line B produces a variety of cereal that is sold for $2 per box. Line B typically produces 6 boxes per day that do not meet company standards and cannot be sold. Line A and Line B produce the same total number of boxes each day.

The linear functions $a(x) = 3(x - 4)$ and $b(x) = 2(x - 6)$ represent the total amount each line can produce taking into account the boxes that do not meet company standards and cannot be sold. Write a linear function that represents the total number of boxes the lines can produce combined.

Line A: $\frac{1}{2}x$ $a(x) = 3\left(\frac{1}{2}x - 4\right)$

Line B: $\frac{1}{2}x$ $b(x) = 2\left(\frac{1}{2}x - 6\right)$

$c(x) = a(x) + b(x)$

$= 3\left(\frac{1}{2}x - 4\right) + 2\left(\frac{1}{2}x - 6\right)$

$= \frac{3}{2}x - 12 + \frac{2}{2}x - 12$

$= \frac{5}{2}x - 24$

The linear function $c(x) = \frac{5}{2}x - 24$ represents the total number of boxes that Line A and Line B can produce combined.

Name _____ Date _____

8. A pretzel manufacturer has two production lines. Line A produces a variety of pretzel that is sold for $2.40 per bag. Line A typically produces 3 bags per day that do not meet company standards and cannot be sold. Line B produces a variety of pretzel that is sold for $3.60 per bag. Line B typically produces 4 bags per day that do not meet company standards and cannot be sold. Line A produces 3 times as many bags as Line B each day.

The linear functions $a(x) = 2.4(x - 3)$ and $b(x) = 3.6(x - 4)$ represent the total number of bags each line can produce taking into account the bags that do not meet company standards and cannot be. Write a linear function that represents the total number of bags the lines can produce combined.

9. Carlos has a roadside stand that sells peaches. He sells his peaches for $1.99 per pound. He typically loses 5 pounds per week to spoilage. Hector also has a roadside stand that sells peaches. He sells his peaches for $2.49 per pound. He typically only loses 1 pound per week to spoilage. Carlos' stand sells twice as many peaches per week as Hector's stand.

The linear functions $c(x) = 1.99(x - 5)$ and $h(x) = 2.49(x - 1)$ represent the total amount each stand can earn taking into account the peaches lost to spoilage. Write a linear function that represents the total amount that Carlos and Hector can earn combined.

10. A lamp manufacturer has two production lines. Line A produces a lamp model that is sold for $24.99 each. Line A typically produces 2 lamps per day that do not meet company standards and cannot be sold. Line B produces a lamp model that is sold for $34.99 each. Line B typically produces 1 lamp per day that does not meet company standards and cannot be sold. Line A produces half as many lamps as Line B each day.

The linear functions $a(x) = 24.99(x - 2)$ and $b(x) = 34.99(x - 1)$ represent the total number of lamps each line can produce taking into account the lamps that do not meet company standards and cannot be sold. Write a linear function that represents the total number of lamps the lines can produce combined.

11. A jean manufacturer has two production lines. Line A produces a style that is sold for $42 each. Line A typically produces 2 pairs per day that do not meet company standards and cannot be sold. Line B produces a style that can be sold for $65 each. Line B typically produces 3 pairs per day that do not meet company standards and cannot be sold. Line A produces three times as many pairs of jeans as Line B each day.

The linear functions $a(x) = 42(x - 2)$ and $b(x) = 65(x - 3)$ represent the total number of pairs of jeans that each line can produce taking into account the jeans that do not meet company standards and cannot be sold. Write a linear function that represents the total number of pairs of jeans the lines can produce combined.

Name _____ Date _____

12. Jada makes and sells handmade puzzles for $32 each. Each month she donates 2 puzzles to a retirement community. Ronna also makes and sells handmade puzzles for $28 each. Each month she donates 2 puzzles to a childcare center. Jada and Ronna make the same number of puzzles each month.

The linear functions $j(x) = 32(x - 2)$ and $r(x) = 28(x - 2)$ represent the total amount each girl can earn taking into account the puzzles that are donated and not sold. Write a linear function that represents the total amount Jada and Ronna can earn combined.

3