**2.3 - Equations of Linear Functions ⸱ Form B**

**Example 1**

**Write each equation in standard from. Identify *A*, *B*, and *C*.**

 **1.** ‒7*x* ‒ 5*y* = 35 **2.** 10*y* ‒3*x* + 6 = 11 **3.** $\frac{4}{5}y+\frac{1}{8}x=4$

**Example 2**

**Write each equation in slope-intercept form. Identify the slope *m* and the *y*-intercept *b*.**

 **4.** 6*x* + 3*y* = 12 **5.** $\frac{2}{3}x$ + $\frac{1}{6}y=2$ **6.** 6*x* + 9*y* = 15

**Example 3**

**7. CHARITY** The linear equation y – 20x = 83 relates the number of shirts collected during a charity clothing drive, where xis the number of hours since noon and yis the total number of shirts collected. Write the equation in slope-intercept form and interpret the parameters of the equation in the context of the situation.

**Example 4**

 **8. PLUMBER** Two neighbors, Camila and Conner, hire the same plumber for household repairs. The plumber worked at Camila’s house for 3 hours and charged her $191. The plumber worked at Conner’s house for 1 hour and charged him $107.

1. Define variables to represent the situation.
2. Find the slope and y-intercept. Then, write an equation.
3. How much would it cost to hire the plumber for 5 hours of work?

**Example 5**

**Write an equation in point-slope form for the line that satisfies each set of conditions.**

 **9.** slope of ‒5, passes through (‒3, ‒8) **10.** slope of $-\frac{2}{3}$, passes through (6, ‒8)

**Example 6**

**Write an equation in point-slope form for a line that passes through each set of points.**

 **11.** (2, ‒3) and (1, 5) **12.** (‒1, ‒2) and (‒3, 1)

**Example 7**

**Solve each problem.**

**13. SALES** Light truck is a vehicle classification for trucks weighing up to 8500 pounds. In 2011, 5.919 million light trucks were sold in the U.S. In 2017, 11.055 million light trucks were sold. Write an equation in point-slope form that represents the number of light trucks *y* sold *x* years after 2010.

**~~14. CONSTRUCT ARGUMENTS~~** ~~Determine whether an equation in the form~~ *~~x~~* ~~=~~ *~~a~~*~~, where~~ *~~a~~* ~~is a constant is~~ *~~sometimes, always,~~* ~~or~~ *~~never~~* ~~a function. Explain your reasoning.~~

**~~15. CREATE~~** ~~Write an equation in point-slope form of a line with an~~ *~~x~~*~~-intercept of 3.~~

**~~16. WRITE~~** ~~Consider the relationship between hours worked and earnings. When would this situation represent a linear relationship? When would this situation represent a nonlinear relationship? Explain your reasoning.~~

**~~17. FIND THE ERROR~~** ~~Dan claims that since~~ *~~y~~* ~~=~~ *~~x~~* ~~+ 1 and~~ *~~y~~* ~~= 3~~*~~x~~* ~~+ 2 are both linear functions, the function~~ *~~y~~* ~~= (~~*~~x~~* ~~+ 1)(3~~*~~x~~* ~~+ 2) must also be linear. Is he correct? Explain your reasoning.~~

**~~18. WRITE~~** ~~Why is it important to be able to represent linear equations in more than one form?~~

**2.4 - Solving Systems of Equations Graphically ⸱ Form B**

**Example 1**

**Determine the number of solutions for each system. Then state whether the system of equations is *consistent* or *inconsistent* and whether it is *independent* or *dependent.***

 **1.** *y* = 3*x*  **3.** 2*x* ‒ 5*y* = 10 **5.** *x* + 2*y* = 5

 *y* = ‒3*x* + 2 3*x* + *y* = 15 3*x* – 15 = –6*y*

**Examples 2 and 3**

**Solve the system of equations by graphing.**

 **7.** *x* – 2*y* = 0 **9.** 2*x* + *y* = 3 **11.** 2*x* – 3*y* = 0

*y* = 2*x* – 3 *y* = $\frac{1}{2}$*x* – $\frac{9}{2}$4*x* ‒ 6*y* = 3

**Example 4**

**Solve each problem.**

**13. USE ESTIMATION** Mr. Lycan is considering buying clay from two art supply companies. Company A sells 50-pound containers of clay for $24, plus $42 to ship the total order. Company B sells the same clay for $28, plus $25 to ship the total order.

**a.** Write equations for the total cost of ordering clay from each company.

**b.** Graph the equations on the same coordinate plane. Examine the graph to estimate how much Mr. Lycan would have to order for the cost of ordering clay from each company to be the same.

**c.** Check your estimate by substituting into each original equation. How reasonable is your estimation? Justify your reasoning.

**~~Example 5~~**

**~~USE TOOLS Use a graphing calculator to solve each system of equations. Round the coordinates to the nearest hundredth, if necessary.~~**

 **~~15.~~** ~~12~~*~~y~~* ~~= 5~~*~~x~~* ~~‒ 15~~ **~~17.~~** ~~5.8~~*~~x~~* ~~‒ 6.3~~*~~y~~* ~~= 18~~

 ~~4.2~~*~~y~~* ~~+ 6.1~~*~~x~~* ~~= 11~~~~‒4.3~~*~~x~~* ~~+ 8.8~~*~~y~~* ~~= 32~~

**~~Example 6~~**

**~~USE TOOLS Use a graphing calculator to solve each system of equations. Round the coordinates to the nearest hundredth, if necessary.~~**

 **~~19.~~** ~~0.0019~~*~~x~~* ~~+ 3.55 = 0.27~~*~~x~~* ~~+ 2.81~~ **~~21.~~** ~~‒47.83~~*~~x~~* ~~‒ 9 = 33~~*~~x~~* ~~+ 71.019~~

**Mixed Exercises**

**Solve each system of equations by graphing.**

**23.** 2*x* ‒ *y* = 3

*x* + 2*y* = 4

**25. LASERS** A machinist programs a laser cutting machine to focus two laser beams at the same point. One beam is

programmed to follow the path *y* = 0.5*x* ‒ 3.15 and the other is programmed to follow 10*x* + 5*y* = 63. Graph both

equations and find the point at which the lasers are focused.

**28. WRITE** Explain how to find the solution to a system of linear equations by graphing.

 **30. CREATE** Write a system of equations that has no solution.

**2.5 - Solving Systems of Equations Algebraically ⸱ Form B**

**Examples 1 and 2**

**Use substitution to solve each system of equations.**

 **1.** 2*x* ‒ *y* = 9 **3**. 2*x* + *y* = 5 **5.** 4*x* ‒ *y* = 6

 *x* + 3*y* = ‒6 3*x* ‒ 3*y* = 3 2*x* ‒ $\frac{y}{2}$ = 4

**Example 3**

**Solve each problem.**

 **7. BAKE SALE** Cassandra and Alberto are selling pies for a fundraiser. Cassandra sold 3 small pies and 14 large pies for a total of $203. Alberto sold 11 small pies and 11 large pies for a total of $220. Determine the cost of each pie.

 **a.** Write a system of equations and solve using substitution.

 **b.** What does the solution represent in terms of this situation?

 **c.** How can you verify that the solution is correct?

**Examples 4-6**

**Use elimination to solve each system of equations.**

 **9.** 3*x* ‒ 2*y* = 4 **11.** 7*x* + 2*y* = ‒1 **13.** *x* – 3*y* = –12

5*x* + 3*y* = ‒2521*x* + 6*y* = ‒9 2*x* + *y* = 11

**Mixed Exercises**

**25. FIND THE ERROR** Gloria and Syreeta are solving the system 6*x* ‒ 4*y* = 26 and ‒3*x* + 4*y* = ‒17. Is either of them correct? Explain your reasoning.

 

**26. CREATE** Write a system of equations in which one equation should be multiplied by 3 and
the other should be multiplied by 4 in order to solve the system with elimination. Then solve your system.

 **27. WRITE** Why is substitution sometimes more helpful than elimination?