Math Connections Worksheets

MAT1033C Intermediate Algebra

Chapter 4

Systems of Equations

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Instructor: **Section:**

Chapter 4 Systems of Equations
Section 4.1 Solving Systems of Linear Equations in Two Variables

Learning Objectives
1. Determine whether an ordered pair is a solution of a system of two linear equations.
2. Solve a system by graphing.
3. Solve a system by substitution.
4. Solve a system by elimination.

Objective 1

Determine whether each given ordered pair is a solution of each system.

1. $(3,5)$

$\begin{cases} 2x-3y=-9 \\ 4x+2y=-2 \end{cases}$

1. _____

2. $(7,0)$

$\begin{cases} x+3y=7 \\ 2x+5y=14 \end{cases}$

2. _____

3, $(-2,-5)$

$\begin{cases} 4x-y=3 \\ y=\frac{1}{2}x+4 \end{cases}$

3. _____

4. $(-4,8)$

$\begin{cases} y=-2x \\ x=\frac{1}{4}y-6 \end{cases}$

4. _____

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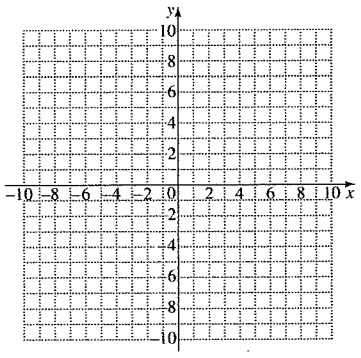
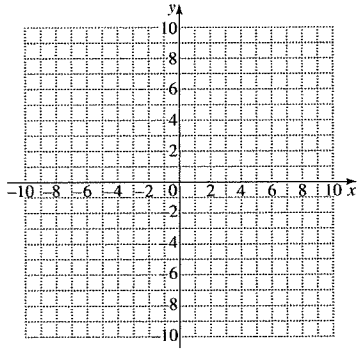
Objective 2

Solve each system of equations by graphing.

5. $\begin{cases} x+y=6 \\ 2x+y=4 \end{cases}$ 5. _____



6. $\begin{cases} 2x-3y=-3 \\ x-4y=6 \end{cases}$ 6. _____



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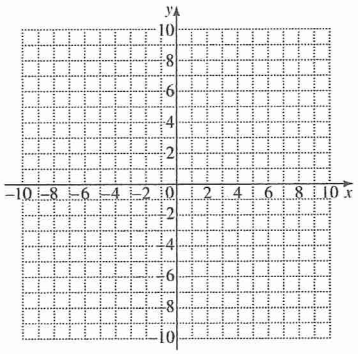
7. $\begin{cases} y = \frac{2}{3}x - 10 \\ y = -\frac{2}{5}x + 6 \end{cases}$ 7. _____



Objective 3

Solve each system of equation by the substitution method.

8. $\begin{cases} 4x - y = 9 \\ 2x + 3y = -27 \end{cases}$ 8. _____

9. $\begin{cases} x + y = 7 \\ 2x - 4y = 2 \end{cases}$ 9. _____

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10. $\begin{cases} \frac{1}{4}x - \frac{1}{3}y = \frac{2}{3} \\ \frac{1}{4}x + \frac{1}{5}y = \frac{2}{5} \end{cases}$ 10. _____

11. $\begin{cases} x = 3y + 2 \\ 5x - 15y = 10 \end{cases}$ 11. _____

Objective 4

Solve the system of equations by the elimination method.

12. $\begin{cases} 4x - 3y = 7 \\ 2x + y = 11 \end{cases}$ 12. _____

13. $\begin{cases} 8x + 6y = 10 \\ 3y = -4x + 5 \end{cases}$ 13. _____

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14. $\begin{cases} 3x = 2y - 4 \\ 4x + 3y = 6 \end{cases}$ 14. _____

15. $\begin{cases} 10x - 10y = -40 \\ 5x + 5y = 20 \end{cases}$ 15. _____

Concept Extension

Solve this system of equations.

16. $\begin{cases} x = y + 2 \\ 3x + 2y = 6 \\ x - 2y = 2 \end{cases}$ 16. _____

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Section 4.3 Systems of Linear Equations and Problem Solving

Learning Objectives

1. Solving problems that can be modeled by a system of two linear equations.
2. Solve problems with cost and revenue functions.
3. Solve problems that can be modeled by a system of three linear equations.

Objective 1

Solve.

1. One number is five more than twice the second number. If the difference between twice the first number and three times the second number is six, what are the two numbers?

1. _____

2. Find how many quarts of 4% butterfat milk and 1% butterfat milk should be mixed to yield 60 quarts of 2% butter fat milk.

2. _____

3. Lucy went to the local pawn shop. She bought $18 bracelets and $25 necklaces. If Lucy bought a total of 26 pieces and spent only $566, how many of each type did she purchase?

3. _____

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4. The perimeter of a rectangle is 52 feet. The length of the rectangle is 6 more than triple the width. Find the dimensions of the rectangle.

4. _____

5. Two joggers leave an apartment building and jog in opposite directions. One jogger travels at 2 mph faster than the other jogger. If after 2.5 hours, they are 15 miles apart, what is the rate of each jogger?

5. _____

Objective 2

Given the cost function and the revenue function, find the number of units x that must be sold to break even.

6. $C(x) = 1.7x + 1700 \qquad R(x) = 2.4x$

6. _____

7. $C(x) = 19x + 2250 \qquad R(x) = 34x$

7. _____

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8. The planning department of Abstract Office Supplies has been asked to determine whether the company should introduce a new computer desk next year. The department estimates that $6000 of new manufacturing equipment will need to be purchased and that the cost of constructing each desk will be $200. The department also estimates that the revenue from each desk will be $450.

   a. Determine the revenue function $R(x)$ from the sale of x desks.

   8a. _____

   b. Determine the cost function $C(x)$ for manufacturing x desks.

   8b. _____

   c. Find the break-even point.

   8c. _____

9. The U-Haul-It company is looking to purchase a new $20,000 truck for its fleet. The company rents out the trucks for $100 each rental. When the truck is returned, it will cost U-Haul-it $50 to clean and get the truck ready for its next renter. When will the company finally start earning money for this vehicle.

   9. _____

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Objective 3

10. One number is four less than the second number. Triple the first number is 1 more than the third number. The sum of all three numbers is 23. Find the numbers.

10. _____

11. The sum of the angles of a triangle is 180 degrees. The sum of the twice the smallest angle and the largest angle is 175 degrees. Three times the second angle less the largest angle is 65 degrees. Find the measures of the angles of the triangle.

11. _____

Concept Extension

12. Find the values of a, b, and c such that the equation $y = ax^2 + bx + c$ has the ordered pair solutions of $(3,27)$, $(-5,131)$, and $(-2,32)$.

12. _____

Answers

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Section 4.1

1. No
2. Yes
3. No
4. Yes
5. $(-2,8)$
6. $(-6,-3)$
7. $(15,0)$
8. $(0,-9)$

9. $(5,2)$
10. $\left(2,-\frac{1}{2}\right)$
11. $\{(x,y)\,|\,x=3y+2\}$
12. $(4,3)$
13. $\{(x,y)\,|\,4x+3y=5\}$
14. $(0,2)$
15. $(0,4)$
16. $(2,0)$

Section 4.3

1. $\{-3,-4\}$
2. 20 qt. of 4%; 40 qt of 1%
3. 12 bracelets; 14 necklaces
4. 5ft. by 21 ft.
5. 4 mph, and 2 mph
6. 2429 units
7. 150 units

8a. $R(x)=450x$

8b. $C(x)=200x+6000$

8c. 24 desks

9. After 400 rentals
10. {4, 8, 11}
11. 45°, 50°, & 85°
12. $a=4,\ b=-5,\ c=6$