Math 0302, Practice Test 3: Systems of Linear Equations

Instructions: Solve the system of equations using substitution. Write the answer as an ordered pair.

#1
$$y = x + 3$$
$$4x - 3y = -7$$

Instructions: Solve the following systems of equations. Write your answers as ordered pairs.

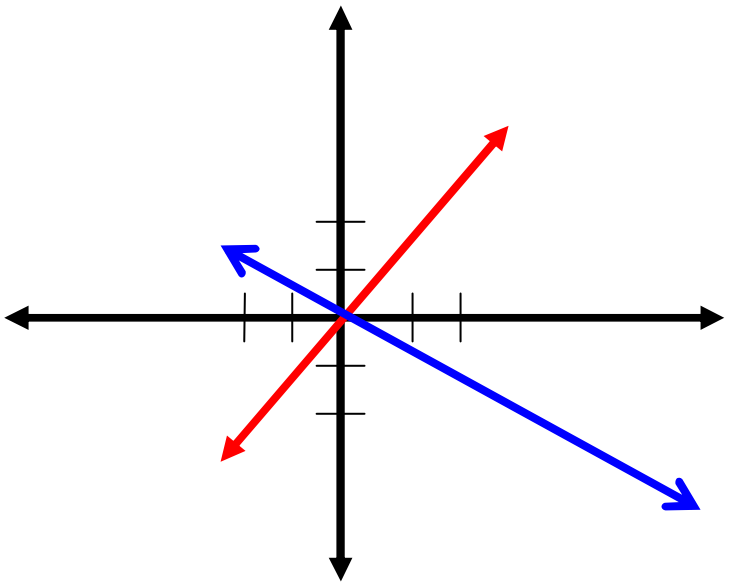
#2
$$x + y = 4$$
$$x - y = -4$$

#3
$$2x + 4y = 36$$
$$3x - 4y = -6$$

#4
$$5x - 2y = 2$$
$$2x + 3y = -22$$

#5
$$8x = -2y + 64$$
$$x + y = 8$$

#6 Identify the solution to the system of linear equations graphed below. Assume the solution is an ordered pair of integers and that all intercepts are integers.



Instructions: Determine if the following systems of equations have one solution, no solution, or infinite many solutions.

#7 $x + 2y = 3$
$3x + 6y = 9$

#8 $y = \frac{2}{5}x + 1$
$y = \frac{5}{2}x - 7$

#9 $3x + y = 4$
$2x - 2y = 8$

#10 $y = 2x + 1$
$y = 2x - 3$

SOLUTIONS

Instructions: Solve the system of equations using substitution. Write the answer as an ordered pair.

#1 $y = x + 3$
$4x - 3y = -7$

$4x - 3(x + 3) = -7$
$4x - 3x - 9 = -7$
$x - 9 = -7$
$x = -7 + 9$
$x = 2$

$y = x + 3$
$y = 2 + 3$
$y = 5$

(2,5)

Instructions: Solve the following systems of equations. Write your answers as ordered pairs.

#2 $x + y = 4$
$x - y = -4$
$2x = 0$

$\frac{2x}{2} = \frac{0}{2}$
$x = 0$

$x + y = 4$
$0 + y = 4$
$y = 4$

(0,4)

#3 $2x + 4y = 36$
$3x - 4y = -6$
$5x = 30$

$\frac{5x}{5} = \frac{30}{5}$
$x = 6$

$2x + 4y = 36$
$2(6) + 4y = 36$
$12 + 4y = 36$
$4y = 36 - 12$
$4y = 24$
$\frac{4y}{4} = \frac{24}{4}$
$y = 6$

(6,6)

#4 $5x - 2y = 2$
$2x + 3y = -22$

$3(5x - 2y = 2)$
$2(2x + 3y = -22)$

$15x - 6y = 6$

$4x + 6y = -44$
$19x = -38$

$\frac{19x}{19} = \frac{-38}{19}$
$x = -2$

$5x - 2y = 2$
$5(-2) - 2y = 2$
$-10 - 2y = 2$
$-2y = 2 + 10$
$-2y = 12$
$\frac{-2y}{-2} = \frac{12}{-2}$
$y = -6$

(–2,–6)

#5 $8x = -2y + 64$
$x + y = 8$

$8x + 2y = 64$
$-2(x + y = 8)$
$8x + 2y = 64$
$-2x - 2y = -16$
$6x = 48$

$\frac{6x}{6} = \frac{48}{6}$

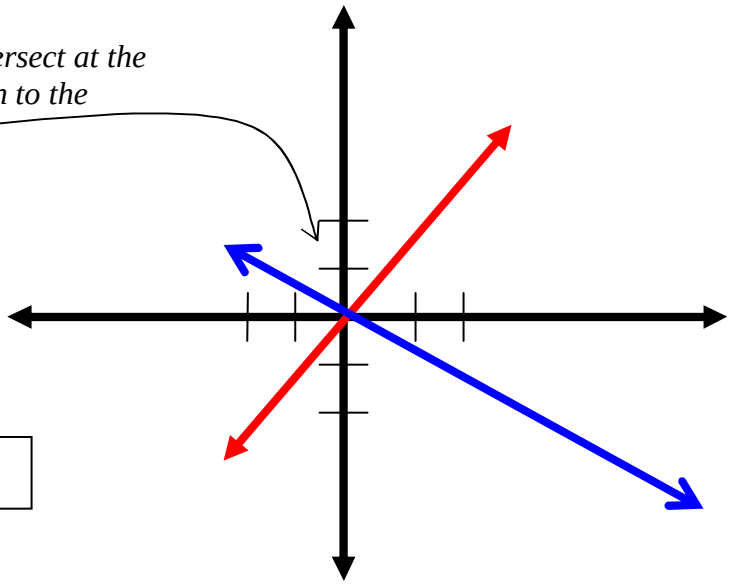
$x = 8$

$x + y = 8$
$8 + y = 8$
$y = 0$

(8,0)

#6 Identify the solution to the system of linear equations graphed below. Assume the solution is an ordered pair of integers and that all intercepts are integers.

Since the lines intersect at the origin, the solution to the system is (0,0).



(0,0)

Instructions: Determine if the following systems of equations have one solution, no solution, or infinite many solutions.

#7

$$x + 2y = 3$$
$$3x + 6y = 9$$

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

$$6y = -3x + 9$$
$$y = -\frac{3x}{6} + \frac{9}{6}$$
$$y = -\frac{x}{2} + \frac{3}{2}$$

Notice that the second equation is a product of three times the first equation. Consequently, both equations represent the same line, and the system will have infinite solutions. Furthermore, the equations have the same slope and same *y*-intercept, so they represent the same line.

#8

$$y = \frac{2}{5}x + 1$$
$$y = \frac{5}{2}x - 7$$

Since these two equations have unequal slopes, they will intersect. Consequently, the system will have one solution.

#9

$$3x + y = 4$$
$$2x - 2y = 8$$

$$3x + y = 4$$
$$y = -3x + 4$$

$$2x - 2y = 8$$
$$-2y = -2x + 8$$
$$y = x - 4$$

Since these two equations have unequal slopes, they will intersect. Consequently, the system will have one solution.

#10

$$y = 2x + 1$$
$$y = 2x - 3$$

Since these two equations have equal slopes (but different *y*-intercepts), they are parallel. Consequently, the system will have no solution.