

Unit 4 Exam Review #2

Short Answer

Solve the system of equations using substitution.

$$1. \begin{cases} y = 3x + 9 \\ y = 4x + 3 \end{cases}$$

$$\begin{array}{r} 3x + 9 = 4x + 3 \\ -3x \quad -3x \\ \hline 9 = x + 3 \\ -3 \quad -3 \\ \hline 6 = x \end{array}$$

$$y = 3(6) + 9$$

$$= 18 + 9$$

$$y = 27$$

$$\begin{matrix} x & y \\ (6, 27) \end{matrix}$$

$$2. \begin{cases} y = 3x - 10 \\ y = 4x - 4 \end{cases}$$

$$\begin{array}{r} 3x - 10 = 4x - 4 \\ -3x \quad -3x \\ \hline -10 = x - 4 \\ +4 \quad +4 \\ \hline -6 = x \end{array}$$

$$y = 3(-6) - 10$$

$$= -18 - 10$$

$$y = -28$$

$$\begin{matrix} x & y \\ (-6, -28) \end{matrix}$$

Solve the system using elimination.

$$3. \begin{cases} 2x - 2y = -8 \\ x + 2y = -1 \end{cases}$$

$$\begin{array}{r} 2x - 2y = -8 \\ -x + 2y = -1 \\ \hline 3x = -9 \\ \hline x = -3 \end{array}$$

$$\begin{array}{r} -3 + 2y = -1 \\ +3 \quad +3 \\ \hline 2y = 2 \\ \hline y = 1 \end{array}$$

$$y = 1$$

$$4. \begin{cases} 3x - 4y = -24 \\ x + y = -1 \end{cases}$$

$$\begin{array}{r} 3x - 4y = -24 \\ 4x + 4y = -4 \\ \hline 7x = -28 \\ \hline x = -4 \end{array}$$

$$x = -4$$

$$\begin{array}{r} x + y = -1 \\ -x + y = -1 \\ +4 \quad +4 \\ \hline 2y = 3 \\ \hline y = 3 \end{array}$$

$$y = 3$$

$$(-4, 3)$$

$$5. \begin{cases} -3x + 2y = 11 \\ -8x + 3y = 27 \end{cases}$$

$$\begin{array}{r} 9x - 6y = -33 \\ -16x + 6y = 54 \\ \hline -7x = 21 \\ \hline x = -3 \end{array}$$

$$-3(-3) + 2y = 11$$

$$9 + 2y = 11$$

$$-9 \quad -9 \\ \hline 2y = 2 \\ \hline y = 1 \end{array}$$

$$y = 1$$

$$(-3, 1)$$

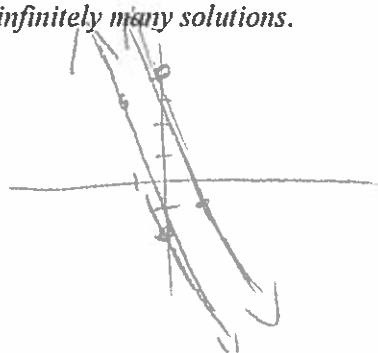
6. Tell whether the system has no solution, one solution, or infinitely many solutions.

$$\begin{cases} y = -5x - 2 \\ y = -5x + 4 \end{cases}$$

$$y = -5x + 4$$

parallel

no solution

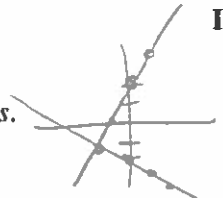


7. Tell whether the system has *no solution*, *one solution*, or *infinitely many solutions*.

$$y = -x - 2$$

$$y = 2x + 2$$

one solution



8. Solve the system of equations

$$3x + 2y = 7$$

$$y = -3x + 11$$

$$3x + 2(-3x + 11) = 7$$

$$3x - 6x + 22 = 7$$

$$-3x + 22 = 7$$

$$-3x = -15$$

$$x = 5$$

$$y = -3(5) + 11$$

$$y = -15 + 11$$

$$y = -4$$

(5, -4)

9. Solve the system of equations.

$$4x + 2y = -12$$

$$5x + 6y = -8$$

$$-12x - 6y = 36$$

$$5x + 6y = -8$$

$$-7x = 28$$

$$x = -4$$

$$4(-4) + 2y = -12$$

$$-16 + 2y = -12$$

$$2y = 4$$

$$y = 2$$

(-4, 2)

10. By what number should you multiply the first equation to solve using elimination?

$$-3x - 3y = 6$$

$$-12x + 5y = -44$$

-4

11. Is (-2, 10) a solution of the linear inequality?

$$y \geq 4x - 5$$

$$10 \geq 4(-2) - 5$$

$$10 \geq -8 - 5$$

yes

12. Write the following inequality in slope-intercept form.

$$14x - 2y \geq -78$$

$$-2y \geq -14x - 78$$

$$y \leq 7x + 39$$

$y \leq 7x + 39$

13. The grocery store sells apples for \$5.00 a pound and bananas for \$3.50 a pound. Write an equation in standard form for the weights of apples a and bananas b that a customer could buy with \$16.

$$5.00a + 3.50b = 16$$

14. At the beginning of the year, you have a balance of \$200 in your bank account. Each month you deposit \$40.
 (a) Write an equation for this situation.

$$y = 40x + 200$$

- (b) Use the equation to find the balance in December. Hint: December is $x = 12$.

$$y = 40(12) + 200$$

$$= 480 + 200$$

$$= \$680$$

Are the graphs of the lines in the pair parallel? Show work to back up your answer.

15. $y = -\frac{5}{6}x - 1$

$-10x - 12y = -15$

$\frac{-10x - 15}{-12} = \frac{10x - 15}{12} = \frac{5}{6}x - \frac{5}{4}$

Circle your answer: **YES** NO

$y = -\frac{10}{12}x + \frac{15}{12}$

$y = -\frac{5}{6}x + \frac{5}{4}$

same slope + diff. y-int.

Tell whether the lines for each pair of equations are parallel, perpendicular, or neither.

16. $\frac{7x - 4y = 4}{x - 4y = 3}$

$-\frac{1}{4}y = \frac{-7x + 4}{-4} = \frac{7}{4}x - 1$

$y = \frac{7}{4}x - 1$

$\frac{x - 4y = 3}{-x} \Rightarrow y = -\frac{1}{4}x + \frac{3}{4}$

$y = -\frac{1}{4}x + \frac{3}{4}$

$y = \frac{1}{4}x - \frac{3}{4}$

neither

17. $y = \frac{1}{2}x + 8$

$8x + 4y = -1$

$\frac{4y}{4} = \frac{-8x - 1}{4} = -2x - \frac{1}{4}$

$y = -2x - \frac{1}{4}$

Parallel

Write the equation of a line in point-slope form that is (a) parallel and (b) perpendicular to the given line and that passes through the given point.

18. $y = \frac{3}{5}x + 5; (9, -4)$

$y - y_1 = m(x - x_1)$

(a) Parallel

$m = \frac{3}{5}$

$y + 4 = \frac{3}{5}(x - 9)$

(b) Perpendicular

$m = -\frac{5}{3}$

$y + 4 = -\frac{5}{3}(x - 9)$

19. $-5x - 10y = -3; (-7, 9)$

(a) Parallel

$m = -\frac{1}{2}$

(b) Perpendicular

$m = 2$

$-\frac{5}{5}x - 10y = -\frac{3}{5}$

$y - 9 = -\frac{1}{2}(x + 7)$

$y - 9 = 2(x + 7)$

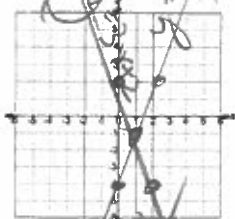
$-\frac{10y}{-10} = \frac{5x - 3}{-10} = -\frac{1}{2}x + \frac{3}{10}$

$y = -\frac{1}{2}x + \frac{3}{10}$

20. Solve the below system of linear equations by graphing.

$y = -3x + 2$

$y = 3x - 4$



$(1, -1)$

Check by subst:

$$\begin{array}{r} -3x + 2 = 3x - 4 \\ + 3x \quad + 3x \\ \hline 2 = 6 - 4 \\ + 4 \quad + 4 \\ \hline 6 = 6 \end{array}$$

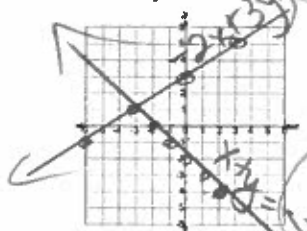
$x = 1$

$y = -3(1) + 2$
 $= -3 + 2$
 $y = -1$

21. Solve the below system of linear equations by graphing.

$x + y = -2$

$-2x + 3y = 9$



$y = -x - 2$

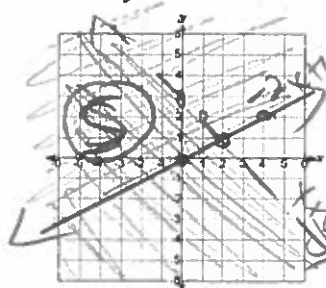
$\frac{3y}{3} = \frac{2x+9}{3}$
 $y = \frac{2}{3}x + 3$

Solution: $(-3, 1)$

22. Solve the following system of inequalities by graphing.

$x + y < 3$

$-2x + 4y \geq 0$



$y < -x + 3$

$\frac{4y}{4} \geq \frac{2x+0}{4}$
 $y \geq \frac{1}{2}x$

$y \geq \frac{1}{2}x$