

*Key*

**Systems of Linear Relations – Practice Test**  
Foundations & PreCalculus 10 Practice Exam

/37

Name:

Date:

1. Given the following linear system, is the point (2, -2) a solution? Prove it by showing your work. (2 marks)

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

$$x + y = 1$$

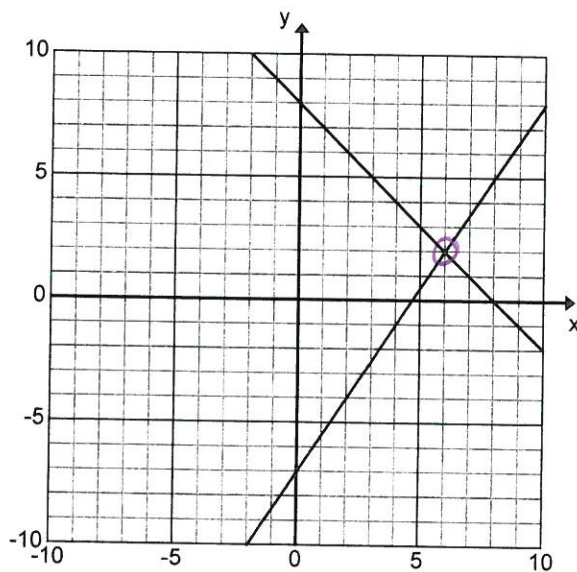
$$2(2) + 3(-2) = -4$$

$$4 - 6 = -4$$

$$-2 = -4 \quad \underline{\underline{\text{No}}}$$

$$2 - 2 = 1$$
$$0 = 1 \quad \text{No}$$

2. Use the graph of the linear system below to find the solution. (1 mark)



*(6, 2)*

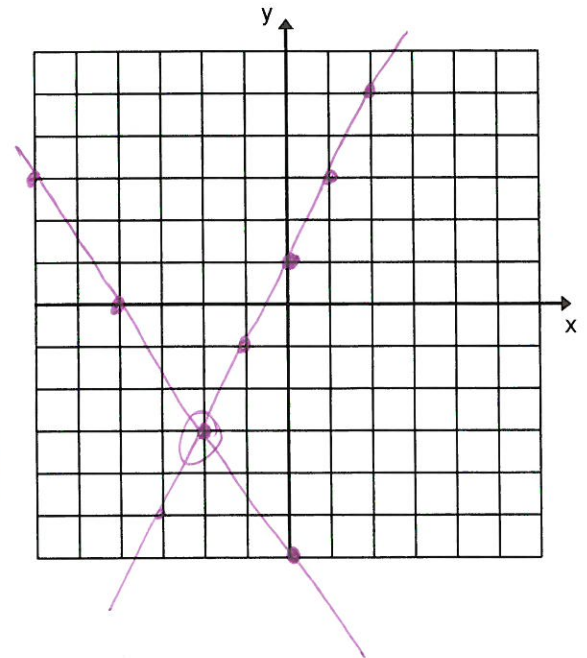
3. Solve the following linear system using the **graphing method**.

You must show all your work. (6 marks)

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

$$y = 2x + 1$$

$$(-2, -3)$$



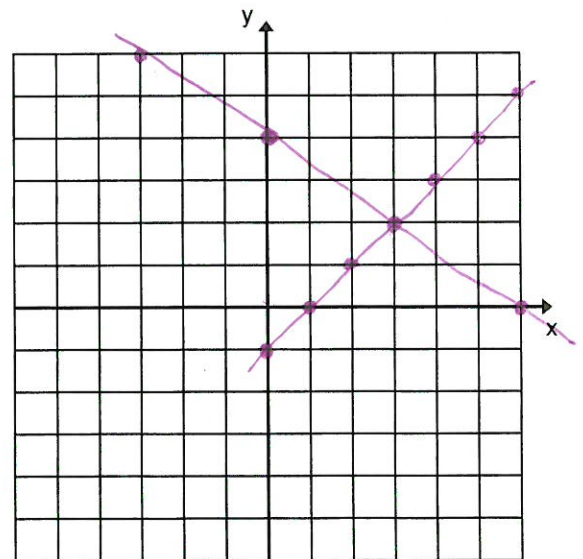
4. Solve the following linear system using the **graphing method**.

You must show all your work. (8 marks)

$$\frac{2}{3}x + y = 4 \quad y = -\frac{2}{3}x + 4$$

$$2x - 2y = 2$$

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



$$(3, 2)$$

5. Solve the following linear system using the **substitution method**.  
You must show all your work. (5 marks)

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

$$x + 2y = 2$$

$$-2y \quad -2y$$

$$x = -2y + 2$$

$$3(-2y + 2) + 4y = -4$$

$$-6y + 6 + 4y = -4$$

$$\begin{array}{r} -2y + 6 = -4 \\ -6 \quad -6 \end{array}$$

$$\begin{array}{r} -2y = -10 \\ -2 \quad -2 \end{array}$$

$$y = 5$$

$$x + 2(5) = 2$$

$$\begin{array}{r} x + 10 = 2 \\ -10 \quad -10 \end{array}$$

$$x = -8$$

$$(-8, 5)$$

Check

$$3(-8) + 4(5) = -4$$

$$-24 + 20 = -4$$

$$-4 = -4 \quad \checkmark$$

$$(-8) + 2(5) = 2$$

$$-8 + 10 = 2$$

$$2 = 2 \quad \checkmark$$

6. Solve the following linear system using the **substitution method**.  
You must show all your work. (5 marks)

$$2x - 4y = 7$$

$$4x + y = 5$$

$$-4x \quad -4x$$

$$y = -4x + 5$$

$$2x - 4(-4x + 5) = 7$$

$$2x + 16x - 20 = 7$$

$$\begin{array}{r} 18x - 20 = 7 \\ +20 \quad +20 \end{array}$$

$$\begin{array}{r} 18x = 27 \\ 18 \quad 18 \end{array}$$

$$x = \frac{3}{2}$$

$$\left(\frac{3}{2}, -1\right)$$

$$2\left(\frac{3}{2}\right) - 4y = 7$$

$$\begin{array}{r} 3 - 4y = 7 \\ -3 \quad -3 \end{array}$$

$$\begin{array}{r} -4y = 4 \\ -4 \quad -4 \end{array}$$

$$y = -1$$

Check

$$2\left(\frac{3}{2}\right) - 4(-1) = 7$$

$$3 + 4 = 7$$

$$7 = 7 \quad \checkmark$$

$$4\left(\frac{3}{2}\right) + (-1) = 5$$

$$6 - 1 = 5$$

$$5 = 5 \quad \checkmark$$

7. Solve the following linear system using the **elimination method**.

You must show all your work. (5 marks)

$$\begin{cases} -5(3x - 4y = 7) \\ 3(5x - 6y = 8) \end{cases}$$

$$\begin{aligned} -15x + 20y &= -35 \\ 15x - 18y &= 24 \end{aligned}$$

$$3x - 4(-5.5) = 7$$

$$\begin{aligned} 2y &= -11 \\ y &= \frac{-11}{2} \text{ or } -5.5 \end{aligned}$$

$$\begin{aligned} 3x + 22 &= 7 \\ -22 &-22 \end{aligned}$$

$$(-5, 5.5)$$

$$\begin{aligned} 3x &= -15 \\ \frac{3x}{3} &= \frac{-15}{3} \\ x &= -5 \end{aligned}$$

Check

$$\begin{aligned} 3(-5) - 4\left(\frac{-11}{2}\right) &= 7 \\ -15 + 22 &= 7 \\ 7 &= 7 \end{aligned}$$

$$\begin{aligned} 5(-5) - 6\left(\frac{-11}{2}\right) &= 8 \\ -25 + 33 &= 8 \\ -33 &-33 \\ -25 &= -25 \end{aligned}$$

8. Solve the following linear system using the **elimination method**.

You must show all your work. (5 marks)

$$\begin{cases} 2(2x + 7y = 24) \\ 7(3x - 2y = -4) \end{cases}$$

$$\begin{aligned} 4x + 14y &= 48 \\ 21x - 14y &= -28 \end{aligned}$$

$$\begin{aligned} 2\left(\frac{4}{5}\right) + 7\left(\frac{16}{5}\right) &= 24 \\ 5\left(\frac{8}{5} + \frac{112}{5}\right) &= (24)5 \end{aligned}$$

$$\begin{aligned} 25x &= 20 \\ x &= \frac{20}{25} \end{aligned}$$

$$\begin{aligned} 8 + 112 &= 120 \\ 120 &= 120 \end{aligned}$$

$$x = \frac{4}{5}$$

$$3\left(\frac{4}{5}\right) = 2\left(\frac{16}{5}\right) - 4$$

$$\begin{aligned} 2\left(\frac{4}{5}\right) + 7y &= 24 \\ 5\left(\frac{8}{5} + 7y\right) &= (24)5 \end{aligned}$$

$$5\left(\frac{12}{5}\right) = \left(\frac{32}{5} - 4\right)5$$

$$\begin{aligned} 8 + 35y &= 120 \\ -8 &-8 \end{aligned}$$

$$12 = 32 - 20$$

$$12 = 12 \checkmark$$

$$\begin{aligned} 35y &= 112 \\ \frac{35y}{35} &= \frac{112}{35} \\ y &= \frac{16}{5} \text{ or } 3.2 \end{aligned}$$