

Pre-Calculus Test Chapter 7

Form A

Show ALL work!!! Step-by-step!!!

- 1 Solve the system of equations by substitution or elimination.

$$-2(3x+2y) = (10)(-2)$$

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

$$\begin{array}{r} -6x - 4y = -20 \\ 6x + 15y = 9 \\ \hline \end{array}$$

$$\frac{11y}{11} = \frac{-11}{11} \quad y = -1$$

$$3x + 2(-1) = 10$$

$$\begin{array}{r} 3x - 2 = 10 \\ +2 \quad +2 \end{array}$$

$$\frac{3x}{3} = \frac{12}{3} \quad x = 4$$

$$\boxed{(4, -1)}$$

- 2 Solve the system of equations by substitution or elimination.

$$-5\left(\frac{9}{5}x + \frac{6}{5}y\right) = (4)(-5)$$

$$9x + 6y = 3$$

$$\begin{array}{r} -9x - 6y = -20 \\ 9x + 6y = 3 \\ \hline \end{array}$$

$$0 = -17 \quad \text{FALSE}$$

$$\boxed{\text{No Solution}}$$

- 3 **Investment Portfolio** A total of \$25,000 is invested in two funds paying 6% and 8.5% simple interest. The investor wants a yearly interest income of \$2,000 from the two investments. What amount should be invested at 8.5% to meet the requirement of \$2,000 per year interest?

X: Amount invested at 6%

Y: Amount invested at 8.5%

$$X + Y = 25,000 \rightarrow X = 25,000 - Y$$

$$.06X + .085Y = 2,000$$

$$.06(25,000 - Y) + .085Y = 2,000$$

$$1,500 - .06Y + .085Y = 2,000$$

$$1,500 + .025Y = 2,000$$

$$-1,500$$

$$\begin{array}{r} .025Y = 500 \\ \hline .025 \quad .025 \end{array}$$

$$Y = \boxed{20,000}$$

- 4 **Geometry** What are the dimensions of a rectangular tract of land if its perimeter is 40 kilometers and its area is 96 square kilometers?

$$P = 40$$

$$P = w + w + l + l$$

$$A = 96$$

$$P = 2w + 2l$$

$$40 = 2w + 2l$$



$$A = lw$$

$$\frac{96}{l} = \frac{lw}{l}$$

$$40 = 2\left(\frac{96}{l}\right) + 2l$$

$$w = \frac{96}{l}$$

$$l(40) = \left(\frac{192}{l} + 2l\right)l \quad -\frac{20}{8} \times -12 \quad (l-8)(l-12) = 0$$

$$40l = 192 + 2l^2$$

$$l = 8 \quad l = 12$$

$$2l^2 - 40l + 192 = 0$$

$$\frac{96}{8} = \frac{8w}{8} \quad w = 12$$

$$2(l^2 - 20l + 96) = 0$$

$$\boxed{8 \text{ km} \times 12 \text{ km}}$$

5 Solve the system of equations by substitution or elimination.

$$2x + 2z = 2 \rightarrow \frac{2x}{2} = \frac{-2z + 2}{2}$$

$$5x + 3y = 4$$

$$3y - 4z = 4$$

$$x = -z + 1$$

$$5(-z + 1) + 3y = 4$$

$$-5z + 5 + 3y = 4$$

$$-5z + 3y = -1$$

$$-1(3y - 5z) = (-1)(-1)$$

$$3y - 4z = 4$$

$$-3y + 5z = 1$$

$$3y - 4z = 4$$

$$z = 5$$

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

$$2x + 10 = 2$$

$$\frac{2x}{2} = \frac{-8}{2} \quad x = -4$$

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

$$-20 + 3y = 4$$

$$\frac{3y}{3} = \frac{24}{3} \quad y = 8$$

$$(-4, 8, 5)$$

6 Solve the system of equations by substitution or elimination.

$$\textcircled{1} 2x + 4y + z = 1$$

$$\textcircled{2} x - 2y - 3z = 2$$

$$\textcircled{3} x + y - z = -1$$

$$\textcircled{1} 2x + 4y + z = 1$$

$$\textcircled{2} -2(x - 2y - 3z) = (-2)(2)$$

$$2x + 4y + z = 1$$

$$-2x + 4y + 6z = -4$$

$$8y + 7z = -3$$

$$\textcircled{2} x - 2y - 3z = 2$$

$$\textcircled{3} -1(x + y - z) = (-1)(-1)$$

$$x - 2y - 3z = 2$$

$$-x - y + z = 1$$

$$-3y - 2z = 3$$

$$3(8y + 7z) = (-3)3$$

$$8(-3y - 2z) = (3)8$$

$$24y + 21z = -9$$

$$-24y - 16z = 24$$

$$-\frac{5z}{5} = \frac{15}{5} \quad z = 3$$

$$8y + 7(3) = -3$$

$$8y + 21 = -3$$

$$\frac{8y}{8} = \frac{-24}{8} \quad y = -3$$

$$\textcircled{3} x + (-3) - (3) = -1$$

$$x - 6 = -1 \quad x = 5$$

$$(5, -3, 3)$$

- 7 **Acid Mixture** Ten liters of 30% acid solution is obtained by mixing a 20% solution with a 50% solution. How much of each solution is required to obtain the specified concentration of the final mixture.

$x$ : Amount of 20% solution  
 $y$ : Amount of 50% solution

$$x + y = 10 \rightarrow y = 10 - x$$

$$(.2)x + (.5)y = (.3)(10)$$

$$.2x + .5(10 - x) = 3$$

$$.2x + 5 - .5x = 3$$

$$\frac{-.3x}{-.3} = \frac{-2}{-.3} = \frac{20}{3} = 6\frac{2}{3}$$

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

$$y = 10 - 6\frac{2}{3}$$

$$y = 3\frac{1}{3}$$

$6\frac{2}{3}$  liters of 20% solution  
 $3\frac{1}{3}$  liters of 50% solution

- 8 **Sports** In Super Bowl I, on January 15, 1967, the Green Bay Packers defeated the Kansas City Chiefs by a score of 35 to 10. The total points scored came from 13 different scoring plays, which were a combination of touchdowns, extra-point kicks, and field goals, worth 6, 1, and 3 points respectively. The same number of touchdowns and extra point kicks were scored. There were six times as many touchdowns as field goals. How many touchdowns, extra-point kicks, and field goals were scored during the game?

$T$ : Touchdowns

$E$ : Extra-point kicks

$F$ : Field goals

$$T + E + F = 13$$

$$6T + 1E + 3F = 45$$

$$T = E$$

$$T = 6F \rightarrow E = 6F$$

$$6F + 6F + F = 13$$

$$\frac{13F}{13} = \frac{13}{13} \quad F = 1$$

$$E = 6(1)$$

$$E = 6$$

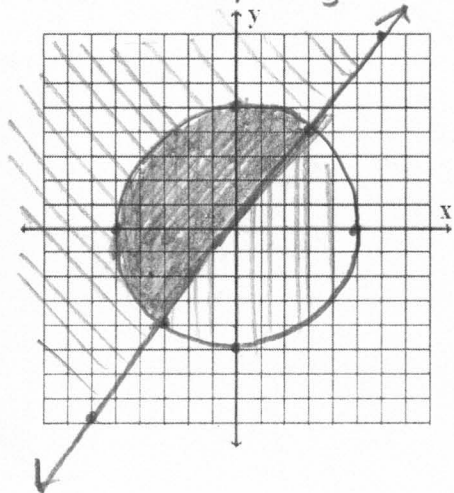
$$T = 6$$

$$T = 6, E = 6, F = 1$$

- 9 Sketch the graph of the system of inequalities and make the solution set clear.

$$x^2 + y^2 \leq 25$$

$$4x - 3y \leq 0 \rightarrow y \geq \frac{4}{3}x$$



- 10 **Shipping** A warehouse supervisor is told to ship at least 50 packages of gravel that weigh 55 pounds each and at least 40 bags of stone that weigh 70 pounds each. The maximum weight capacity in the truck he is loading is 7,500 pounds. Find a system of inequalities describing the numbers of bags of stone and gravel that he can send.

$x$ : Amount of 55lb bags  
 $y$ : Amount of 70lb bags

$$x \geq 50$$

$$y \geq 40$$

$$55x + 70y \leq 7,500$$