

MODULE 2 TOPICS 2 & 3 (Equations, Inequalities, Systems of Equations and Inequalities)

Test Review

see attached pages for worked out solutions

I Match each characteristic of a system (A – D) to the best solution method (1 – 4) for that system.

- | | | |
|----------------------------------------|----------|-------------------------------------------------------|
| 1. Algebraically – elimination method | <u>D</u> | (A) when the numbers are easy to graph |
| 2. Algebraically – either method | <u>B</u> | (B) when an exact solution is needed |
| 3. Algebraically – substitution method | <u>C</u> | (C) when one variable can be easily isolated |
| 4. Graphically | <u>A</u> | (D) when the coefficients of like terms are multiples |

II Solve each system:

$3x - 2y = 2$	$5x + 4y = -14$	$2x + y = 20$	$\begin{cases} 1.5x + 1.2y = 0.6 \\ 0.8x - 0.2y = 2 \end{cases}$	$\begin{cases} -6x + 3y = 6 \\ 8x - 4y = -12 \end{cases}$
$5x - 5y = 10$	$3x + 6y = 6$	$6x - 5y = 12$		
<i>(-2, -4)</i>	<i>(-6, 4)</i>	<i>(7, 6)</i>	<i>(2, -2)</i>	

III

Consider $C = aT$

Solve for a.

Solve for T

Consider $V = \frac{4}{3}\pi r^3$

Consider $y = \frac{1}{5}xm$

Solve for x.

Solve for m.

Solve for π .

$a = \frac{C}{T}$
 $x = \frac{5y}{m}$

$T = \frac{C}{a}$
 $m = \frac{5y}{x}$

$\pi = \frac{3V}{4r^3}$

IV

Solve: $11(x - 7) - 2 = -46$

$\frac{29}{18} + \frac{1}{2}x = -\frac{5}{3}(x + \frac{1}{3})$

$-x + \frac{1}{2}x = \frac{67}{12} + x + \frac{5}{3} - 2$

$x = 3$

$x = -1$

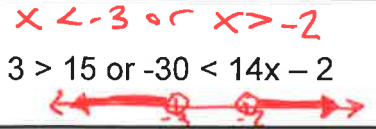
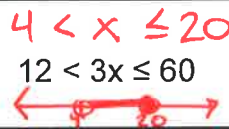
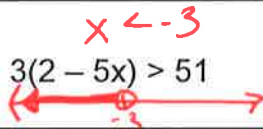
$x = -3.5$

V

Solve and graph: $3(2 - 5x) > 51$

$12 < 3x \leq 60$

$-4x + 3 > 15$ or $-30 < 14x - 2$



VI

Graph the compound inequalities: *see worked out solutions*

$x < -3$ or $x \geq 90$

$x > 3$ and $x \leq -2$

$x > 4$ and $x \leq 10$

$x < 2$ or $x \geq -5$

VII

Write in standard form: $y = \frac{1}{3}x - 9$

$y = -\frac{3}{5}x + 6$

Write $7x + 4y = 20$ in general form

$x - 3y = 27$

$3x + 5y = 30$

$y = -\frac{7}{4}x + 5$

Name the y-intercept of $3x - 4y = 12$ *(0, -3)*

Name the x-intercept of $-2x + 5y = 10$ *(-5, 0)*

VIII

9. Renee has two job offers to be a door-to-door food processor salesperson. Pro Process Processors offers her a base salary of \$15,000 per year plus an additional \$25 for each processor she sells. Puree Processors offers her a base salary of \$18,000 per year plus an additional \$21 for each processor she sells. Determine the number of food processors Renee would have to sell for both companies to pay her the same amount. Explain which job offer Renee should accept based on the number of food processors she expects to sell.

10. Alex needs to rent a bulldozer. Smith's Equipment Rentals rents bulldozers for a delivery fee of \$600 plus an additional \$37.50 per day. Robinson's Equipment Rentals rents bulldozers for a delivery fee of \$400 plus an additional \$62.50 per day. Determine the number of rental days for which both rental companies charge the same amount. Explain which company Alex should choose based on the number of days he expects to rent a bulldozer.

see worked out solutions

Module 2 Topics 2 & 3 Test Review

Answer Key

- I
1. elimination - coefficients are multiples (D)
 2. algebraically - when exact solution needed (B)
 3. substitution - when 1 variable can be isolated (C)
 4. graphically - when #'s easy to graph (A)

II

$$\begin{array}{r} 3x - 2y = 2 \rightarrow 3x - 2y = 2 \\ \frac{2}{5}(5x - 5y = 10) + -2x + 2y = 4 \\ \hline \end{array}$$

$$\begin{array}{r} 3(-2) - 2y = 2 \\ -6 - 2y = 2 \\ -2y = 8 \\ y = -4 \end{array}$$

$$\begin{array}{r} -2(-2) + 2(-4) = -4 \\ 4 - 8 = -4 \\ -4 = -4 \end{array}$$

(-2, -4) x = -2 y = -4 ✓

$$\begin{array}{r} 5x + 4y = -14 \\ \frac{3}{3}x + \frac{6}{3}y = \frac{6}{3} \rightarrow x + 2y = 2 \rightarrow x = -2y + 2 \end{array}$$

$$\begin{array}{r} 5(-2y + 2) + 4y = -14 \\ -10y + 10 + 4y = -14 \\ -6y + 10 = -14 \\ -6y = -24 \\ y = 4 \end{array}$$

$$\begin{array}{r} 3x + 6(4) = 6 \\ 3x + 24 = 6 \\ 3x = -18 \\ x = -6 \end{array}$$

$$\begin{array}{r} 5(-6) + 4(4) = -14 \\ -30 + 16 = -14 \\ -14 = -14 \end{array}$$

(-6, 4) y = 4 x = -6 ✓

$$\begin{array}{r} 2x + y = 20 \rightarrow y = -2x + 20 \\ 6x - 5y = 12 \rightarrow 6x - 5(-2x + 20) = 12 \\ 6x + 10x - 100 = 12 \\ 16x - 100 = 12 \\ 16x = 112 \\ x = 7 \end{array}$$

$$\begin{array}{r} 2(7) + y = 20 \\ 14 + y = 20 \\ y = 6 \\ 6(7) - 5(6) = 12 \\ 42 - 30 = 12 \\ 12 = 12 \end{array}$$

(7, 6) y = 6 x = 7 ✓

II continued

$$\begin{array}{l} 1.5x + 1.2y = 0.6 \\ 0.8x - 0.2y = 2 \end{array} \rightarrow \begin{array}{l} 1.5x + 1.2y = 0.6 \\ 4.8x - 1.2y = 12 \\ \hline 6.3x = 12.6 \\ 6.3 \quad 6.3 \\ \hline x = 2 \end{array}$$

$$(2, -2)$$

$$\begin{array}{l} 1.5(2) + 1.2y = .6 \\ 3 + 1.2y = .6 \\ 1.2y = -2.4 \\ y = -2 \\ \\ .8(2) - .2(-2) = 2 \\ 1.6 + .4 = 2 \\ 2 = 2 \checkmark \end{array}$$

III

$$\begin{array}{l} C = aT \\ \frac{C}{a} = T \\ \frac{C}{a} = T \\ \hline T = \frac{C}{a} \end{array}$$

$$\begin{array}{l} C = aT \\ \frac{C}{T} = a \\ \frac{C}{T} = a \\ \hline a = \frac{C}{T} \end{array}$$

$$\begin{array}{l} 5(y = \frac{1}{5}xm) \\ 5y = xm \\ \frac{5y}{m} = \frac{xm}{m} \\ \frac{5y}{m} = x \\ \hline x = \frac{5y}{m} \end{array}$$

$$\begin{array}{l} 5(y = \frac{1}{5}xm) \\ 5y = xm \\ \frac{x}{x} = \frac{5y}{x} \\ \frac{5y}{x} = m \\ \hline m = \frac{5y}{x} \end{array}$$

$$\frac{3}{4} (V = \frac{4}{3} \pi r^3)$$

$$\frac{1}{r^3} \cdot \frac{3V}{4} = \frac{\pi r^3}{r^3}$$

$$\frac{3V}{4r^3} = \pi$$

$$\pi = \frac{3V}{4r^3}$$

IV

$$\begin{array}{l} 11(x-7) - 2 = -46 \\ 11x - 77 - 2 = -46 \\ 11x - 79 = -46 \\ +79 \quad +79 \\ \hline 11x = 33 \\ \hline x = 3 \end{array}$$

$$\begin{array}{l} 18 \left[\frac{29}{18} + \frac{1}{2}x = -\frac{5}{3} \left(x + \frac{1}{3} \right) \right] \\ 29 + 9x = -30 \left(x + \frac{1}{3} \right) \\ 29 + 9x = -30x - 10 \\ 29 + 39x = -10 \\ 39x = -39 \\ \hline x = -1 \end{array}$$

IV continued

$$12\left(-x + \frac{1}{2}x = \frac{67}{12} + x + \frac{5}{3} - 2\right)$$

$$-12x + 6x = 67 + 12x + 20 - 24$$

$$-6x = 63 + 12x$$

$$\frac{-18x}{-18} = \frac{63}{-18}$$

$$x = -3.5$$

V

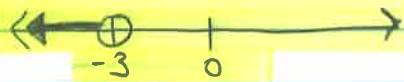
$$3(2-5x) > 51$$

$$6-15x > 51$$

$$\frac{-6}{-6} \quad \frac{-6}{-6}$$

$$\frac{-15x}{-15} > \frac{45}{-15}$$

$$x < -3$$



$$12 < 3x \leq 60$$

$$\frac{12}{3} < \frac{3x}{3} \leq \frac{60}{3}$$

$$4 < x \leq 20$$



$$-4x + 3 > 15 \quad \text{or} \quad -30 < 14x - 2$$

$$\frac{-4x}{-4} > \frac{12}{-4}$$

$$x < -3$$

$$\frac{-28}{14} < \frac{14x}{14}$$

$$-2 < x$$



VI

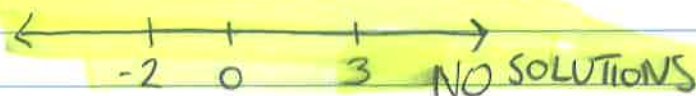
$$x < -3 \quad \text{or} \quad x \geq 90$$



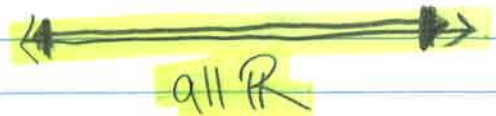
$$x > 4 \quad \text{and} \quad x \leq 10$$



$$x > 3 \quad \text{and} \quad x \leq -2$$



$$x < 2 \quad \text{or} \quad x \geq -5$$



VII

$$y = \frac{1}{3}x - 9$$

$$\begin{array}{r} +9 \qquad +9 \\ \hline 3(y+9 = \frac{1}{3}x) \\ 3y+27 = x \\ -3y \qquad -3y \\ \hline 27 = x - 3y \\ \hline x - 3y = 27 \end{array}$$

$$y = -\frac{3}{5}x + 6$$

$$\begin{array}{r} +\frac{3}{5}x + \frac{3}{5}x \\ \hline 5(\frac{3}{5}x + y = 6) \\ \hline 3x + 5y = 30 \end{array}$$

$$7x + 4y = 20$$

$$\begin{array}{r} -7x \qquad -7x \\ \hline 4y = -7x + 20 \\ \hline \frac{4y}{4} = \frac{-7x+20}{4} \end{array}$$

$$3x - 4y = 12$$

$$\begin{array}{r} 3(0) - 4y = 12 \\ -4y = 12 \\ y = -3 \end{array}$$

$$(0, -3)$$

$$-2x + 5y = 10$$

$$\begin{array}{r} -2x + 5(0) = 10 \\ -2x = 10 \\ x = -5 \end{array}$$

$$(-5, 0)$$

$$y = \frac{7}{4}x + 5$$

VIII

Pm Process	Pure e
$y = 15000 + 25x$	$y = 18000 + 21x$
$15000 + 25x = 18000 + 21x$	
$\quad \quad - 21x$	$\quad \quad - 21x$
$\hline 15000 + 4x = 18000$	
$4x = 3000$	
$x = 750$	

$y = 15000 + 25(100)$	$y = 18000 + 21(100)$
$15000 + 2500$	$18000 + 2100$
17500	20100

If Renee sells less than 750 processors, she will make more money at Pure Processors.

If Renee sells more than 750 processors, she will make more money at Pm Process Processors.

VIII continued

Smith	Robinson
$y = 37.5x + 600$	$y = 62.5x + 400$
$37.5x + 600 = 62.5x + 400$	
$-37.5x$	$-37.5x$
<hr/>	
$600 = 25x$	
$24 = x$	

Robinson is cheaper to start (lower initial value)
Smith is cheaper in long run (lower rate of change)

Alex should rent from Robinson if he is going to rent for less than 24 days
Alex should rent from Smith if he is going to rent for more than 24 days