

Unit #1 Review – Linear Systems

MPM2D

Topics

- ▶ Representing Linear Relations – 4 ways

- ▶ Solving Linear Relations

- ▶ Graphically

→ using $y = mx + b$
→ intercepts
x Int
y Int

- ▶ Substitution

- ▶ Elimination

- ▶ Word Problems

- ▶ Let statements

- ▶ Developing the equations

- ▶ Exploring Linear Systems

- ▶ # of solutions

≤ 0
infinite #

↘ Equation
Graph
Words
Table of Values
(1st differences)



Review Word Problems – pg. 55 #13

13. On weekends, as part of his exercise routine, Carl goes for a run, partly on paved trails and partly across rough terrain. He runs at 10 km/h on the trails, but his speed is reduced to 5 km/h on the rough terrain. One day, he ran 12 km in 1.5 h. How far did he run on the rough terrain?

Let t represent distance on trails
Let r represent distance on rough terrain

$$\textcircled{1} \quad t + r = 12$$

$$\textcircled{2} \quad \frac{t}{10} + \frac{r}{5} = 1.5$$

$$s = \frac{d}{t}$$

$$s = \frac{d}{t} \quad \text{isolate } t$$

$$st = \frac{d}{\cancel{t}}$$

$$\frac{\cancel{st}}{\cancel{s}} = \frac{d}{s}$$
$$t = \frac{d}{s}$$

$$\textcircled{1} \quad t + r = 12$$

$$\textcircled{2} \quad \frac{t}{10} + \frac{r}{5} = 1.5 \quad \textcircled{2} \times 10$$

$$\frac{\cancel{10}t}{\cancel{10}} + \frac{\cancel{10}r}{5} = 10(1.5)$$

$$\textcircled{3} \quad t + 2r = 15$$

$$\textcircled{1} \quad t + r = 12$$

$$\textcircled{3} \quad t + 2r = 15$$

$$\textcircled{1} - \textcircled{3} \quad -1r = -3$$

$$\frac{-1r}{-1} = \frac{-3}{-1}$$

$$r = 3$$

sub in ①

$$t + r = 12$$

$$t + 3 = 12$$

$$t = 12 - 3$$

$$t = 9$$

\therefore He ran 3km on rough terrain

Review # of solutions – pg. 59 #6

6. An air traffic controller is plotting the course of two jets scheduled to land in 15 min. One aircraft is following a path defined by the equation $3x - 5y = 20$ and the other by the equation $18x = 30y + 72$. Should the controller alter the paths of either aircraft? Justify your decision.



$$\textcircled{1} \quad 3x - 5y = 20$$

$$\textcircled{2} \quad 18x = 30y + 72$$

Airplanes will crash into each other unless # of solutions is zero.

$$\textcircled{1} \quad 3x - 5y = 20$$

$$\cancel{3x} - \cancel{3x} - 5y = -3x + 20$$

$$-5y = -3x + 20$$

$$\frac{-5y}{-5} = \frac{-3x}{-5} + \frac{20}{-5}$$

$$y = \frac{3}{5}x - 4$$

$$m = \frac{3}{5} \quad b = -4$$

$$\textcircled{2} \quad 18x = 30y + 72$$

$$18x - 72 = \cancel{30y + 72} - \cancel{72}$$

$$18x - 72 = 30y$$

$$\frac{18x - 72}{30} = \frac{30y}{30}$$

$$\frac{3}{5}x - 2.4 = y$$

$$m = \frac{3}{5} \quad b = -2.4$$

\therefore No solutions, \therefore No crash

Test Review Questions

- ▶ Pg. 62 – 63 Practice Questions
 - ▶ #1-3,5,7 – 9, 12 - 16
- ▶ Pg. 64 Chapter Self-Test
 - ▶ # 2 - 4, 7 - 9

