21st October

Completed Exercises from the lecture on

〈Linear Equations in Two Variables〉

1. Easy, Pages 2-5;
2. Medium, Pages 6-7;
3. Hard, Page 8;

Can be found below.

Two

Linear Equations in One Variables

Easy

(1) **b23bba4c** MULTIPLE CHOICE One answer only

$$3a + 4b = 25$$

A shipping company charged a customer $25 to ship some small boxes and some large boxes. The equation above represents the relationship between a, the number of small boxes, and b, the number of large boxes, the customer had shipped. If the customer had 3 small boxes shipped, how many large boxes were shipped?

a. 5
b. 4
c. 6
d. 3

3 · small + large = $25

3a + 4b = 25

item	amount
3 ·	s
+	
4 ·	l
	= $25

(2) **87322577** MULTIPLE CHOICE One answer only

$$x + y = 75$$

The equation above relates the number of minutes, x, Maria spends running each day and the number of minutes, y, she spends biking each day. In the equation, what does the number 75 represent?

a. The total number of minutes spent running and biking each day
b. The number of minutes spent running each day
c. The number of minutes spent biking for each minute spent running
d. The number of minutes spent biking each day

x: # mins running

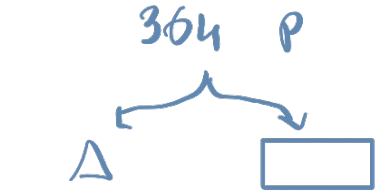
y: # mins biking

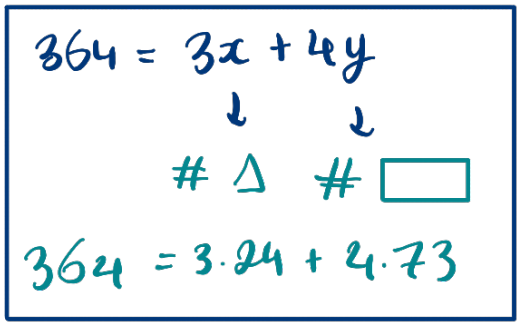
75 = x + y = # mins running + biking

(3) **c6b151d4** MULTIPLE CHOICE One answer only

A total of 364 paper straws of equal length were used to construct two types of polygons: triangles and rectangles. ~~The triangles and rectangles were constructed so that no two polygons had a common side~~. The equation $3x + 4y = 364$ represents this situation, where is the number of triangles constructed and is the number of rectangles constructed. What is the best interpretation of $(x, y) = (24, 73)$ in this context?

a. If 73 triangles were constructed, then 24 rectangles were constructed.
b. If 24 triangles were constructed, then 73 rectangles were constructed.
c. If 24 triangles were constructed, then 73 paper straws were used.
d. If 73 triangles were constructed, then 24 paper straws were used.





$= 0.1 \times 60 = 6$

(4) **8c98c834** MULTIPLE CHOICE One answer only

song

The equation $y = 0.1x$ models the relationship between the number of different pieces of music a certain pianist practices, y, during an $x-$minute practice session. How many pieces did the pianist practice if the session lasted 30 minutes?

a. 10
b. 30
c. 1
d. 3

x (minutes)	y
10	1
20	2
30	3

y songs played in x minutes

$y \text{ songs} = \frac{1}{10} \times \text{minutes}$

Songs $y(30 \text{ mins}) = 0.1 \cdot 30 = 3$

Medium

(1) **002dba45** SHORT ANSWER Case-Insensitive

Line k is defined by $y = -\frac{17}{3}x + 5$. Line j is perpendicular to line k in the $xy-$plane. What is the slope of line j?

$k: y = \underbrace{\frac{-17}{3}}_{m_1} x + 5$

$j: y = m_2 x + c_2$

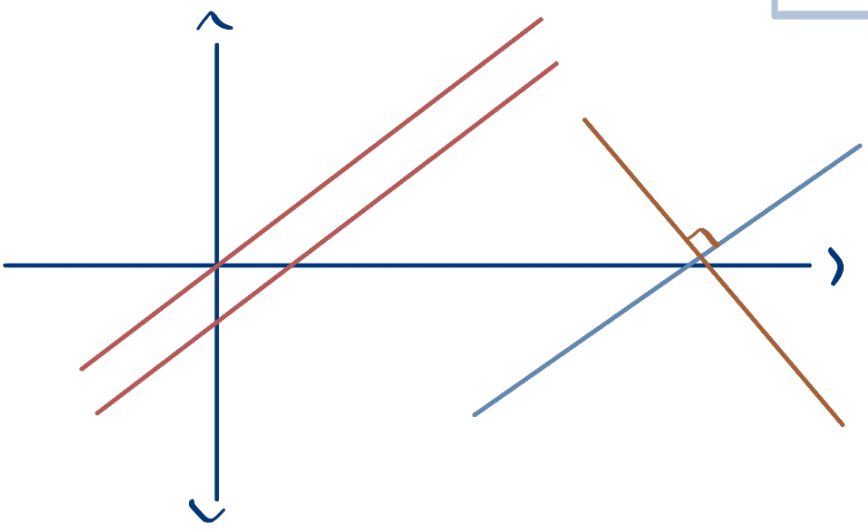
$= \boxed{\frac{3}{17}} x + c_2$

↳ answer

If k, j perpendicular (normal)
then $m_1 \cdot m_2 = -1$
or $m_2 = -\frac{1}{m_1}$

↳ additive
multiplicative } inverse

If k, j parallel
then $m_1 = m_2$



(2) **9c7741c6** SHORT ANSWER Case-Insensitive

On a 210−mile trip, Cameron drove at an average speed of 60 miles per hour for the first x hours. He then completed the trip, driving at an average speed of 50 miles per hour for the remaining y hours. If $x = 1$, what is the value of y?

60 miles/hour × 1 hour = 60 miles

50 miles/hour × y hours = 150 miles

210 miles

$50y = 150$

$\Rightarrow y = 3$

$60x + 50y = 210$

60 mph · 1 hr = 60 m

50 mph · y hr = 50·y m

$\Rightarrow 50 \cdot y + 60 = 210$

210 m

Hard

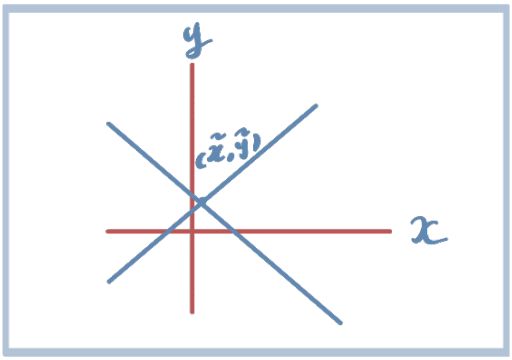
(1) **3cdbf026** MULTIPLE CHOICE One answer only

The graph of the equation $ax + ky = 6$ is a line in the $xy-$plane, where a and k are constants. If the line contains the points $(-2, -6)$ and $(0, -3)$, what is the value of k?

a. -1
b. 2
c. 3
d. -2

Claim 1: 2 points ⇒ 2 equations

Claim 2: 2 equations + 2 variables ⇒ solvable.



x y

~~(-2,-6): -2a - 6k = 6~~

(0,-3): $-3k = 6 \Rightarrow \boxed{-2 = k}$