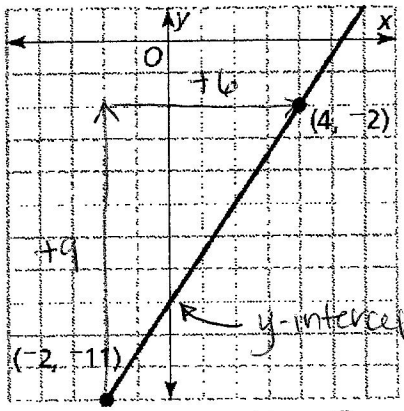
Algebra 8 TWMM Review

Write the equation for the lines shown in the graphs below.

A



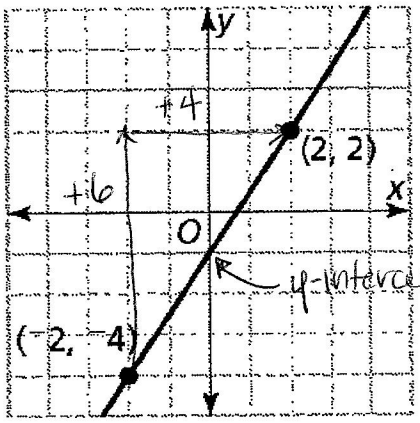
y-intercept (0, −8)

slope $= \frac{\Delta y}{\Delta x} = \frac{-2+11}{4+2} = \frac{9}{6} = \frac{3}{2}$

$y = mx + b$
$y = \frac{3}{2}x + b$
$-2 = \frac{3}{2}(4) + b$
$-2 = 6 + b$
$-6 \quad -6$
$-8 = b$

$\boxed{y = \frac{3}{2}x - 8}$

B



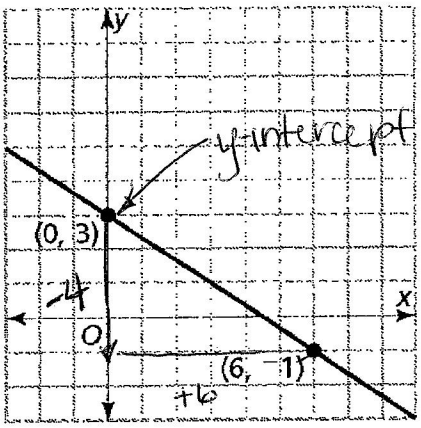
y-intercept (0, −1)

slope $= \frac{\Delta y}{\Delta x} = \frac{2+4}{2+2} = \frac{6}{4} = \frac{3}{2}$

$y = mx + b$
$y = \frac{3}{2}x + b$
$2 = \frac{3}{2}(2) + b$
$2 = 3 + b$
$-3 \quad -3$
$-1 = b$

$\boxed{y = \frac{3}{2}x - 1}$

C



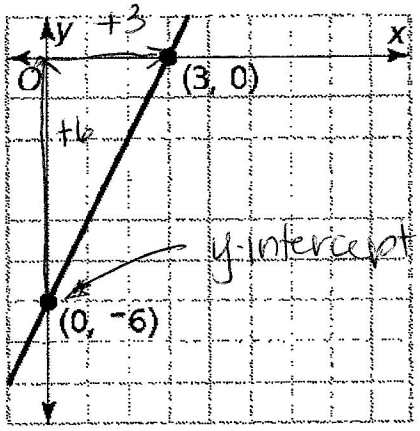
(0, 3)

slope $= \frac{\Delta y}{\Delta x} = \frac{3+1}{0-6} = \frac{4}{-6} = \frac{-2}{3}$

$y = mx + b$
$y = -\frac{2}{3}x + b$
$3 = -\frac{2}{3}(0) + b$
$3 = b$

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

D



(0, −6)

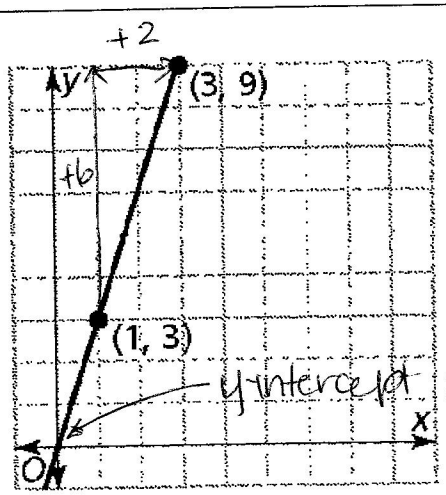
slope $= \frac{\Delta y}{\Delta x} = \frac{0-6}{3-0} = \frac{6}{3} = 2$

$y = mx + b$
$y = 2x + b$
$0 = 2(3) + b$
$0 = 6 + b$
$-6 \quad -6$
$-6 = b$

$\boxed{y = 2x - 6}$

Algebra 8 TWMM Review

E



slope $= \frac{\Delta y}{\Delta x} = \frac{9-3}{3-1} = \frac{6}{2} = 3$

$y = 3x + b$

$9 = 3(3) + b$

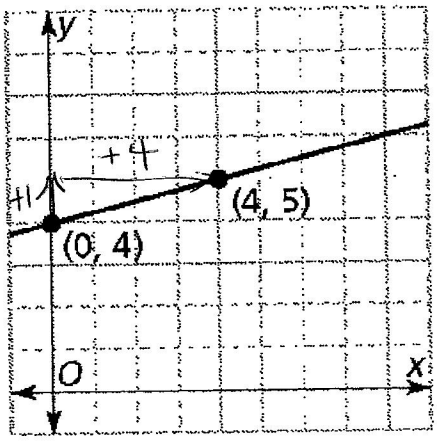
$9 = 9 + b$

$-9 \quad -9$

$0 = b$

$\boxed{y = 3x}$

F



slope $= \frac{\Delta y}{\Delta x} = \frac{5-4}{4-0} = \frac{1}{4}$

$y = mx + b$

$y = \frac{1}{4}x + b$

$4 = \frac{1}{4}(0) + b$

$4 = 0 + b$

$4 = b$

$\boxed{y = \frac{1}{4}x + 4}$

Algebra 8 TWMM Review

Determine whether the relationship between x and y is linear or not. If it is linear, write the equation. If it is not linear, explain how you know.

G

	+2	+2	+2	
x	2	4	6	8
y	21	16	12	7
	-5	-4	-5	

Not Linear

As x increases by 2, y does not increase by a constant amount.

H

	+1	+2	+2	
x	1	2	4	6
y	15	19	27	35
	+4	+8	+8	

$\frac{\Delta y}{\Delta x} = \frac{8}{2} = 4$

Linear - constant slope between all points!

$y = mx + b$
$y = 4x + b$
$15 = 4(1) + b$
$15 = 4 + b$
$-4 \quad -4$
$11 = b$

$\boxed{y = 4x + 11}$

I

	+1	+1	+1	
x	1	2	3	4
y	16	24	32	40
	+8	+8	+8	

Linear - as x increases by 1, y increases by 8

slope $= \frac{\Delta y}{\Delta x} = \frac{8}{1} = 8$

$y = mx + b$
$y = 8x + b$
$16 = 8(1) + b$
$16 = 8 + b$
$-8 \quad -8$
$8 = b$

$\boxed{y = 8x + 8}$

J

	-10	-8	-8	
x	5	-5	-13	-21
y	-2	3	7	11
	+5	+4	+4	

Linear - constant slope between all points! $\frac{5}{-10} = \frac{4}{-8} = \frac{4}{-8}$ slope $= -\frac{1}{2}$

$y = mx + b$
$y = -\frac{1}{2}x + b$
$-2 = -\frac{1}{2}(5) + b$
$-2 = -\frac{5}{2} + b$
$+\frac{5}{2} \quad +\frac{5}{2}$
$\frac{1}{2} = b$

$\boxed{y = -\frac{1}{2}x + \frac{1}{2}}$

K

	+3	+3	+6	
x	3	6	9	15
y	2	3	4	6
	+1	+1	+2	

Linear - constant slope between all points $\frac{1}{3} = \frac{1}{3} = \frac{2}{6}$

$y = mx + b$
$y = \frac{1}{3}x + b$
$2 = \frac{1}{3}(3) + b$
$2 = 1 + b$
$-1 \quad -1$
$1 = b$

$\boxed{y = \frac{1}{3}x + 1}$

L

	+1	+1	+1	
x	1	2	3	4
y	2	4	8	16
	+2	+4	+8	

Not Linear

As the value of x increases by 1, the value of y does not change by a constant amount.

Algebra 8 TWMM Review

M

	+1	+1	+1	
x	2	3	4	5
y	15	17	19	21
	+2	+2	+2	

slope $= \frac{\Delta y}{\Delta x} = \frac{2}{1} = 2$ Linear

$y = mx + b$
$y = 2x + b$
$15 = 2(2) + b$
$15 = 4 + b$
$-4 \quad -4$
$11 = b$

$y = 2x + 11$

N

	+2	+2	+2	
x	2	4	6	8
y	17	29	41	53
	+12	+12	+12	

$\frac{\Delta y}{\Delta x} = \frac{12}{2} = 6$

Linear: As the value of x increases by 2 the value of y increase by 12.

$y = mx + b$
$y = 6x + b$
$17 = 6(2) + b$
$17 = 12 + b$
$-12 \quad -12$
$5 = b$

$y = 6x + 5$

O

	+2	+4	+2	
x	-4	-2	2	4
y	6	10	18	22
	+4	+8	+4	

Linear: There is a constant slope between all points. $\frac{4}{2} = \frac{8}{4} = \frac{4}{2} = 2$!

$y = mx + b$
$y = 2x + b$
$6 = 2(-4) + b$
$6 = -8 + b$
$+8 \quad +8$
$14 = b$

$y = 2x + 14$

P

	+3	+3	+6	
x	3	6	9	15
y	8	7	6	5
	-1	-1	-1	

Not Linear: There is not a constant slope between the points $-\frac{1}{3} = -\frac{1}{3} \neq -\frac{1}{6}$

Q

	+18	+5	+7	
x	7	25	30	37
y	-2	-2	-2	-2
	+0	+0	+0	

Linear: There is a constant slope between all the points $\frac{0}{18} = \frac{0}{5} = \frac{0}{7} = 0$

$y = mx + b$
$y = 0x + b$
$-2 = 0(7) + b$
$-2 = 0 + b$
$-2 = b$

$y = -2$

R

	+2	+2	+2	
x	1	3	5	7
y	10	7	4	1
	-3	-3	-3	

Linear: As the value of x increases by 2, the value of y decreases by 3.

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

$y = mx + b$
$y = -\frac{3}{2}x + b$
$10 = -\frac{3}{2}(1) + b$
$10 = -\frac{3}{2} + b$
$+\frac{3}{2} \quad +\frac{3}{2}$
$\frac{23}{2} = b$

$y = -\frac{3}{2}x + \frac{23}{2}$

Algebra 8 TWMM Review

Write the equation of the line given the following conditions:

S

passes through the points

(2, 7) and (6, 15)

(2,7) → +8
+4 (6,15)

$\frac{\Delta y}{\Delta x} = \frac{8}{4} = 2$

$y = mx + b$
$y = 2x + b$
$7 = 2(2) + b$
$7 = 4 + b$
$-4 \quad -4$
$3 = b$

$\boxed{y = 2x + 3}$

T

with slope −2 that

passes through the point (3, −9)

$y = -2x + b$
$-9 = -2(3) + b$
$-9 = -6 + b$
$+6 \quad +6$
$-3 = b$

$\boxed{y = -2x - 3}$

U

passes through the points

(2, −9) and (−2, 3)

(2, −9) → +12
−4 (−2, 3)

$\frac{\Delta y}{\Delta x} = \frac{12}{-4} = -3$

$y = mx + b$
$y = -3x + b$
$-9 = -3(2) + b$
$-9 = -6 + b$
$+6 \quad +6$
$-3 = b$

$\boxed{y = -3x - 3}$

V

with slope $\frac{3}{2}$ that

passes through the point (−2, 0)

$y = mx + b$
$y = \frac{3}{2}x + b$
$0 = \frac{3}{2}(-2) + b$
$0 = -3 + b$
$+3 \quad +3$
$3 = b$

$\boxed{y = \frac{3}{2}x + 3}$

W

passes through the points

(4, 1) and (−2, 4)

(4,1) → +3
−6 (−2,4)

$\frac{\Delta y}{\Delta x} = \frac{3}{-6} = -\frac{1}{2}$

$y = mx + b$
$y = -\frac{1}{2}x + b$
$1 = -\frac{1}{2}(4) + b$
$1 = -2 + b$
$+2 \quad +2$
$3 = b$

$\boxed{y = -\frac{1}{2}x + 3}$

X

with slope $\frac{2}{3}$ that

passes through the point (6, 2)

$y = mx + b$
$y = \frac{2}{3}x + b$
$2 = \frac{2}{3}(6) + b$
$2 = 4 + b$
$-4 \quad -4$
$-2 = b$

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

Algebra 8 TWMM Review

Y

passes through the points (2, 1) and (6, 9)

(2, 1) → +8 → (6, 9)
+4

$\frac{\Delta y}{\Delta x} = \frac{8}{4} = 2$

$y = mx + b$
$y = 2x + b$
$1 = 2(2) + b$
$1 = 4 + b$
$-4 \quad -4$
$-3 = b$

$y = 2x - 3$

Z

with slope -4 that passes through the point (−7, 5)

$y = mx + b$
$y = -4x + b$
$5 = -4(-7) + b$
$5 = 28 + b$
$-28 \quad -28$
$-23 = b$

$y = -4x - 23$

a

with slope = $\frac{1}{2}$ that passes through the point (-10, 7)

$y = mx + b$
$y = \frac{1}{2}x + b$
$7 = \frac{1}{2}(-10) + b$
$7 = -5 + b$
$+5 \quad +5$
$12 = b$

$y = \frac{1}{2}x + 12$

b

passes through the points (2, -11) and (-5, 10)

(2, -11) → +21 → (-5, 10)
−7

$\frac{\Delta y}{\Delta x} = \frac{21}{-7} = -3$

$y = mx + b$
$y = -3x + b$
$-11 = -3(2) + b$
$-11 = -6 + b$
$+6 \quad +6$
$-5 = b$

$y = -3x - 5$

c

passes through the points (8, 2) and (-2, 7)

(8, 2) → +5 → (-2, 7)
−10

$\frac{\Delta y}{\Delta x} = \frac{5}{-10} = -\frac{1}{2}$

$y = mx + b$
$y = -\frac{1}{2}x + b$
$2 = -\frac{1}{2}(8) + b$
$2 = -4 + b$
$+4 \quad +4$
$6 = b$

$y = -\frac{1}{2}x + 6$

d

passes through the points (-2, 2) and (3, -2)

(-2, 2) → −4 → (3, -2)
+5

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

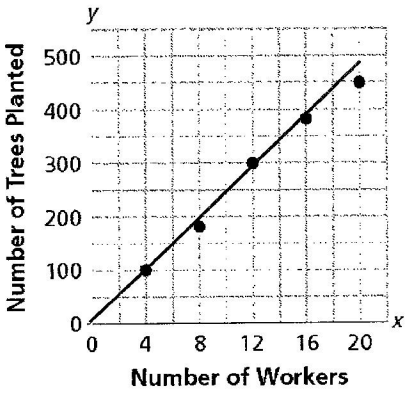
$y = mx + b$
$y = -\frac{4}{5}x + b$
$2 = -\frac{4}{5}(-2) + b$
$2 = \frac{8}{5} + b$
$-\frac{8}{5} \quad -\frac{8}{5}$
$\frac{2}{5} = b$

$y = -\frac{4}{5}x + \frac{2}{5}$

Algebra 8 TWMM Review

Using Mathematical Models

The number of seeding trees that can be planted in one day depends on the number of students in the work group. Data from several different work groups is shown in the next graph.



a. Write an equation for your graph model relating trees planted to number of workers.

b. Use your linear model to estimate how many trees will be planted by a work crew of 14.

c. Use your linear model to estimate how many workers will be required to plant 270 trees.

d. What is the slope of your linear model? What does that slope tell about the relationship between the variables?

a) • Draw a line that looks like it goes as closely as possible to all points.
• Pick 2 points on the line to use to find an equation: (4,100) (8,200)

+4 < (4,100) / (8,200) > +100 $\frac{\Delta y}{\Delta x} = \frac{100}{4} = 25$

$y = mx + b$
$y = 25x + b$
$100 = 25(4) + b$
$100 = 100 + b$
$-100 \quad -100$
$0 = b$

$y = 25x$

b) $y = 25x$
$y = 25(14)$
$y = 350$

Substitute 14 for x

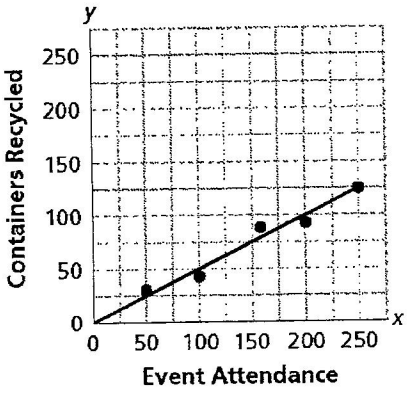
14 crew members can plant 350 trees

c.) $y = 25x$
$\frac{270}{25} = \frac{25x}{25}$
$10.8 = x$

It will take approximately 11 crew members to plant 270 trees in a day.

d.) The slope of the model is 25.
This tells us that 25 trees can be planted by 1 worker in a day.

At Metropolis Middle School the student government earns money by recycling cans and bottles after school events. Some sample (*attendance, containers*) data are shown in the graph below, along with a line modeling the pattern in the data.



a. Use the points (200, 100) and (50, 25) to find an equation in the form $y = mx + b$ for the modeling line.

b. Use your model to find about how many containers will be recycled if 125 people attend a chorus concert?

c. What attendance at a basketball game will produce about 125 containers to be recycled?

d. Explain what the values of *m* and *b* in your equation tell about the relationship between number of containers to be recycled and attendance at the school event.

a.) (200, 100) and (50, 25); -150, -75

$\frac{\Delta y}{\Delta x} = \frac{-75}{-150} = \frac{1}{2}$

$y = mx + b$

$y = \frac{1}{2}x + b$

$100 = \frac{1}{2}(200) + b$

$100 = 100 + b$

$-100 \quad -100$

$0 = b$

$y = \frac{1}{2}x$

where: y is the # of containers recycled

x is the # of people attending the event

b) $y = \frac{1}{2}x$ substitute 125 for x

$y = \frac{1}{2}(125)$

$y = 62.5$

Approximately 63 cans will be recycled if 125 people attend the concert

c) $y = \frac{1}{2}x$ substitute 125 for y

(2) $125 = \frac{1}{2}x$ (2)

$250 = x$

250 people attending the basketball game to produce 125 recycled containers.

d) m is the slope = $\frac{1}{2}$

This tells us that 1 container is recycled for every 2 people attending an event.

b is the y-intercept = 0

This tells us that no containers are recycled when no people attend an event.

Susan measured the heights of 1, 2, 3, and 4 stacked cups. Here are her data:

Number of cups	1	2	3	4
Height of the stack of cups	7 cm	8 cm	9 cm	10 cm

a. Write an equation to describe the pattern

b. What does the coefficient of x mean in this context? Does it have a unit of measure?

c. What does the constant term mean in this context? Does it have a unit of measure?

a.)

# cups	1	2	3	4
height of stack	7	8	9	10

(+1, +1, +1 between the columns)

$y = x + 6$

$\text{slope} = \frac{\Delta y}{\Delta x} = \frac{1}{1} = 1$

$y = mx + b$
$y = 1x + b$
$7 = 1(1) + b$
$7 = 1 + b$
$-1 \quad -1$
$6 = 6$

b.) The coefficient of x is 1.
This means the height of the stack increases by 1 cm for every cup added, which is the height of the lip of the cup

The units are: cm/1 cup

c.) The constant term is 6 cm.
6cm is the height of one cup not including the lip.