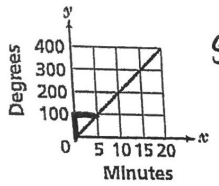
Spiral:

10. John drew the graph below to represent a situation.



Slope = $\frac{100°}{5 \text{ min.}} = \frac{20°}{1 \text{ min.}}$

Which statement could describe the situation John graphed?

A The temperature of a frozen pizza cooking in an oven increases 5 degrees every minute.

B The temperature of a frozen pizza cooking in an oven increases 10 degrees every minute.

C The temperature of a frozen pizza cooking in an oven increases 15 degrees every minute.

D The temperature of a frozen pizza cooking in an oven increases 20 degrees every minute.

11. Alisa pays $0.50 per hour to park her car at the museum. Which graph correctly shows the relationship between the hours, x, Alisa's car is parked and the total parking cost in dollars, y?

$\$ = .50x$

A

C

B

D

Name: _____ **Class:** _____

M8-U4: End of Unit Homework **Date:** _____

1.
The table below shows the cost of different numbers of goldfish at a pet store.

COST OF GOLDFISH

Number of Goldfish	Cost
5	$1.50
10	$3.00
15	$4.50
20	$6.00

+5 +1.50

$\frac{\$1.50}{5 \text{ fish}} = \frac{.30}{1 \text{ fish}}$

The cost is a linear function of the number of goldfish. Which statement describes the rate of change of this function?

A The cost increases $0.30 each time 1 goldfish is added.

B The cost increases $1.50 each time 1 goldfish is added.

C The cost increases $3.00 each time 5 goldfish are added.

D The cost increases $6.00 each time 5 goldfish are added.

2.
The four tables below show relationships in which the x values represent inputs and the y values represent the corresponding outputs.

Q

x	y
–2	–3
1	3
3	–3
5	3

R

x	y
–1	–5
2	4
3	7
4	10

S

x	y
–2	3
1	3
3	3
5	3

T

x	y
3	4
4	5
3	–4
4	–5

Which table represents a relationship that is not a function?

A Q

B R

C S

D T

7

3.

Madison created two functions.
For Function A, the value of y is two less than four times the value of x.
The table below represents Function B.

Function B

x	y
−3	−9
−1	−5
1	−1
3	3

+2 +4

slope ↓

A: $y = 4x - 2$

slope = $\frac{4}{2} = 2$

In comparing the rates of change, which statement about Function A and Function B is true?

A Function A and Function B have the same rate of change.

B Function A has a greater rate of change than Function B has.

C Function A and Function B both have negative rates of change.

D Function A has a negative rate of change and Function B has a positive rate of change.

4

The table below represents a linear function.

x	y
−1	5
1	9
3	13
5	17

+2 +4

$y = 2x + 7$

slope: $\frac{4}{2} = 2$

y-int: where $x = 0$

$y = mx + b$

$5 = 2(-1) + b$

$5 = -2 + b$

$7 = b$

Which function has a greater slope and a greater y-intercept than the linear function represented in the table?

A $y = 2x + 8.5$

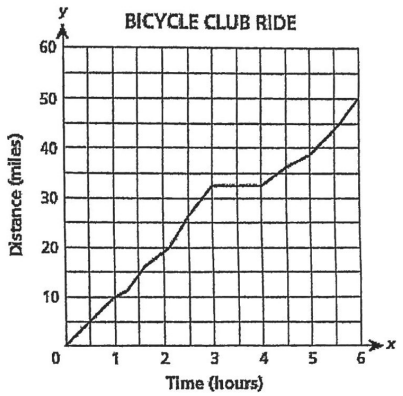
B $y = 3x + 7.5$

C $y = 5x + 6.5$

D $y = 10x + 5.5$

5.

A bicycle club went on a six-hour ride. The graph below shows the relationship between the number of hours spent on the trails and the number of miles traveled.



Speed = mph

Which statement best interprets information provided by the graph?

A The club members rode at a constant speed for the entire ride.

B The club members stopped for a rest during their ride.

C The number of miles traveled increased continuously throughout the ride.

D The number of miles traveled increased some of the time and decreased some of the time.

6.

Which phrase describes a nonlinear function?

A the area of a circle as a function of the radius

B the perimeter of a square as a function of the side length

C the cost of gasoline as a function of the number of gallons purchased

D the distance traveled by a car moving at constant speed as a function of time

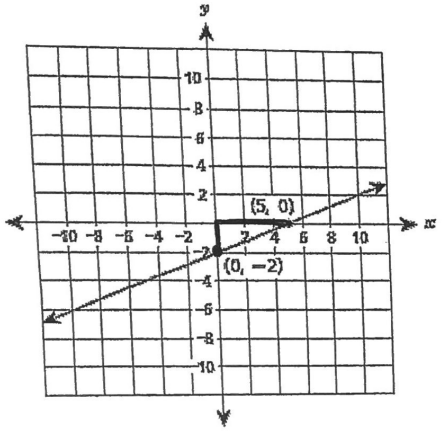
A- $A = \pi r^2$

B- $P = 4s$

C- $C = 3.9g$

D- $D = 5t$

7.
Which equation represents the line shown on the coordinate grid below?



(A) $y = \frac{2}{5}x - 2$

B $y = \frac{2}{5}x + 5$

C $y = -\frac{2}{5}x - 2$

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

y-int: −2

slope : $\frac{\text{rise}}{\text{run}} = \frac{2}{5}$

8.
Which equation represents a linear function?

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

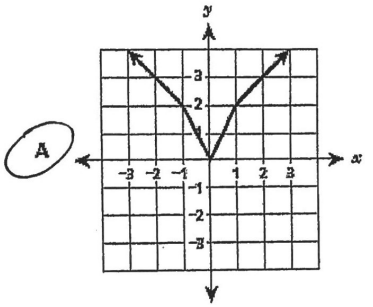
B $y = x^2 + 2$

C $y = \sqrt[3]{x+1}$

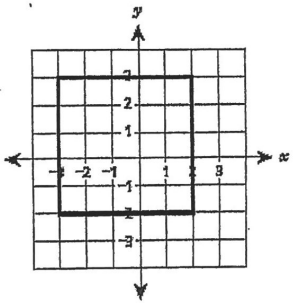
(D) $y = -\frac{2}{3}x - \frac{1}{2}$

9.
Which graph represents a function?

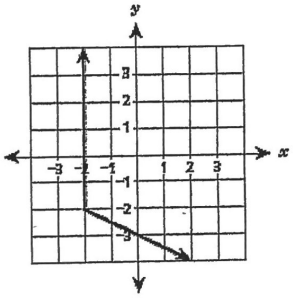
(A)



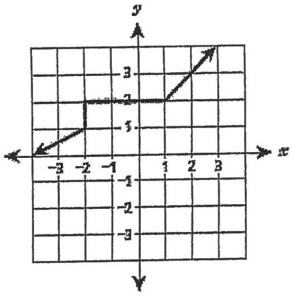
C



B



D



10.
Annette plans to visit an amusement park where she must pay for admission and purchase tickets to go on the rides. Annette wants to find the total cost for a day at the amusement park. She wrote the equation $c = 1.50x + 12$ to predict c, the total cost for a day at the amusement park. What could the number 12 represent in Annette's equation?

↓ starting point

A the number of rides

(B) the cost of admission

C the cost of each ticket

D the number of tickets

11.

Does the equation below define a linear function?

$y = \frac{3}{x}$, when $x \neq 0$

Explain how you got your answer.

Answer

no, x cannot be in the denominator of the fraction

10

Name: _____ Class: _____

M8-U4: Function & Linear Relationships Review **Total: 50pts**

Multiple Choice: Circle the letter/number that best answers each question below. *(2 pts each)*

1. What is the equation of the line that passes through point $(5,8)$ and has a y-intercept of -2?

(0, -2)

$\frac{-2+8}{0-5} = \frac{-10}{-5}$

a) $y = \frac{5}{2}x - 2$ b) $y = \frac{7}{2}x - 2$ c) $y = 2x - 2$ d) $y = 6x - 2$

2. Which table *does not* show the patterns of a linear relationship?

a)

x	y
-2	5
3	-5
7	-13
11	-21

+5 +4 +4 → -10 -8 -8 ✓

b)

x	y
-3	4
-1	6
1	7
3	10

+2 +2 +1 +3

c)

x	y
-2	-4
-1	-1
0	2
1	5

+1 +3

d)

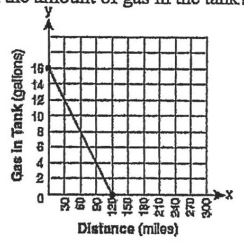
x	y
-2	10
0	20
2	30
4	40

+2 +10

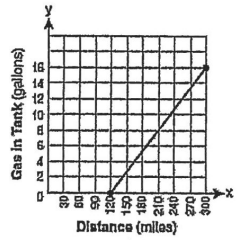
3. The gas tank in a car holds a total of 16 gallons of gas. The car travels 75 miles on 4 gallons of gas. If the gas tank is full at the beginning of a trip, which graph represents the rate of change in the amount of gas in the tank?

y-int=16

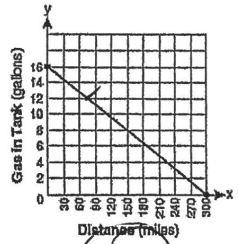
slope = $\frac{-4\text{gal}}{75\text{mi}}$



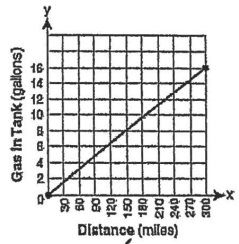
(1)



(3) ✗



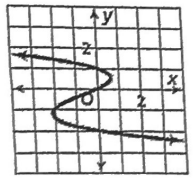
(2)



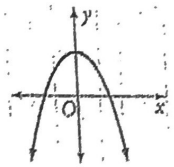
(4) ✗

4. Which diagram represents a function?

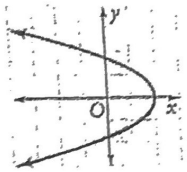
a)



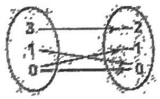
b)



c)



d)



5. Based on the following two functions, which statement is correct?

Function A				
x	1	3	4	6
y	5	13	17	25

Function B
$y = 4x - 3$

a) Function A has a greater rate of change than Function B.

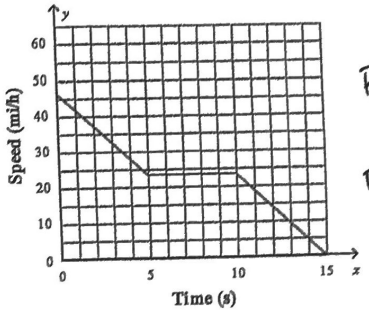
b) Function B has a greater rate of change than Function A.

c) The rates of change are equal for both functions.

d) Function B has a negative rate of change while Function A is positive.

Short Answer: Answer the following questions completely. Show all of your work and remember to label your answers.

6. Use the graph below. Describe the speed of a car over time. *(3 pts)*



From 0-5 sec, it decreases
From 5-10 sec, stays the same,
From 10 to 15 sec, decreases again

7. For each of the equations below find their slopes and y-intercepts. *(1 pt each)*

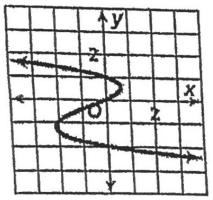
a) $y = \frac{3}{4}x - 6$ slope 3/4 y-intercept -6

b) $y = 7 - 2x$ slope 7 y-intercept -2

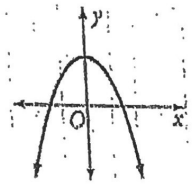
11

4. Which diagram represents a function?

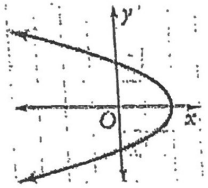
a)



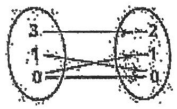
b)



c)



d)



5. Based on the following two functions, which statement is correct?

Function A				
x	1	3	4	6
y	5	13	17	25

+4

Function B
$y = 4x - 3$

a) Function A has a greater rate of change than Function B.

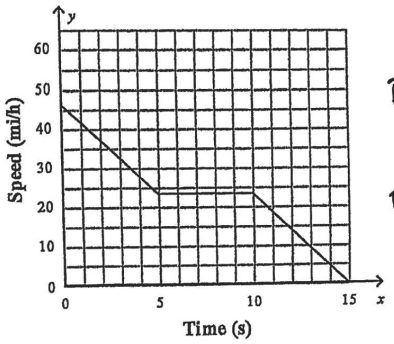
b) Function B has a greater rate of change than Function A.

c) The rates of change are equal for both functions.

d) Function B has a negative rate of change while Function A is positive.

Short Answer: Answer the following questions completely. Show all of your work and remember to label your answers.

6. Use the graph below. Describe the speed of a car over time. *(3 pts)*



From 0-5 sec, it decreases
From 5-10 sec, stays the same,
From 10 to 15 sec, decreases again

7. For each of the equations below find their slopes and y-intercepts. *(1 pt each)*

a) $y = \frac{3}{4}x - 6$ slope 3/4 y-intercept -6

b) $y = 7 - 2x$ slope 7 y-intercept -2

12

8. Giyen the following relations: *(3 pts)*

$\{(-5,1),(-3,-2),(0,3),(1,1),(2,0),(6,4),(8,-2),(8,7)\}$

State the domain and range for the relation.

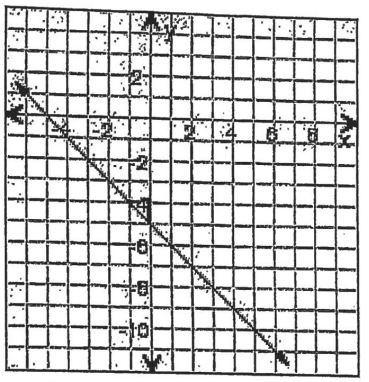
D: {-5, -3, 0, 1, 2, 6, 8, 8}

R: {1, -2, 3, 1, 0, 4, -2, 7}

Professor Octavius said the relation above is also a function. Explain why Professor Octavius is correct or incorrect.

Incorrect - an element of the domain (8) goes to 2 different elements of the range (-2, 7)

9. What is the slope, *y*-intercept, and equation for the following graph? *(3 pts)*

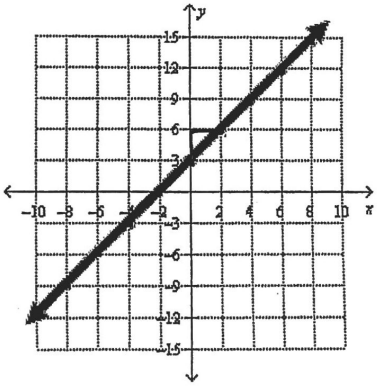


Slope: -1

y-intercept: -5

Equation: y = -x - 5

10. What is the slope, *y*-intercept, and equation for the following graph? *(3 pts)*



Slope: 3/2

y-intercept: 3

Equation: y = 3/2 x + 3

11. Complete the table below with the missing values for y. *(3 pts)*

x	y
-4	14
-3	11
-2	8
-1	5
0	2
1	-1

+1 (-4 → -3), -3 (14 → 11)

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

y-int

On the line below, write a function rule that shows the relationship between x and y in the table.

Answer $y = -3x + 2$

12. A line contains the points (2, 1) and (4, 5). What is the equation of the line? *Must be solved algebraically.* *(3 pts)*

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{5-1}{4-2} = \frac{4}{2} = 2 = m$

$(2, 1)$ $m = 2$

$1 = 2(2) + b$

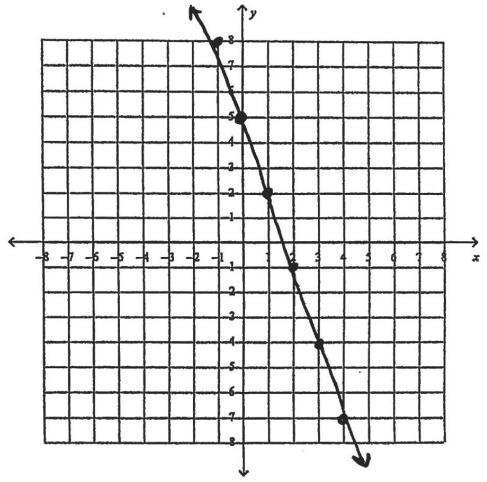
$1 = 4 + b$

$-4 \quad -4$

$-3 = b$

Equation: ~~y = 2x + 3~~ $y = 2x - 3$

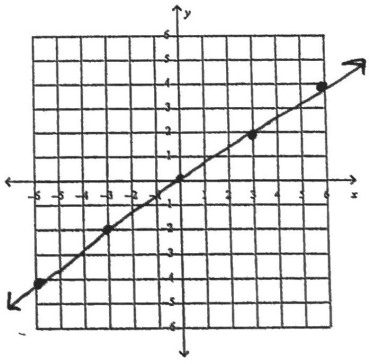
13. a) Graph the following equation: $y = -3x + 5$. *(3 pts)*



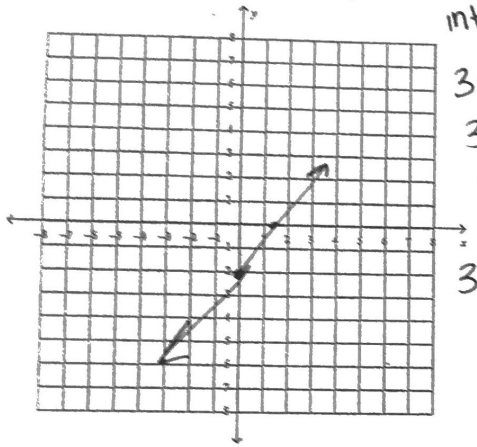
b) Is (4, -8) a solution to the above equation? Show or explain.

no b/c (4,-7) lies on the line but (4,-8) does not

14. Graph the following equation: $y = \frac{2}{3}x$. *(2 pts)*



15. a) Graph the following equation: $3x - 2y = 4$. Use intercepts! *(3 pts)*



$3x - 2(0) = 4$

$3x = 4$

$x = \frac{4}{3}$ $(\frac{4}{3}, 0)$ x_1 y_1

$3(0) - 2y = 4$

$-2y = 4$

$y = -2$ $(0, -2)$ x_2 y_2

b) What is the slope and y-intercept of the graph above?

y-int $= -2$ slope $= \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2 - 0}{0 - \frac{4}{3}} = \frac{-2}{-\frac{4}{3}} = \frac{3}{2}$

16. The cost, C, of a car wash depends on the time you wash, t. Suppose a car wash costs \$1.50 per minute plus a \$2 initial charge. *(4 pts)*

a) Write a function for the cost of a car wash.

$C = 1.50t + 2$

b) Using the equation, what is the cost of a 14 minute car wash?

$C = 1.50(14) + 2$

$= 23$

c) Using the equation, how long can you wash your car if you are charged \$20?

$20 = 1.5t + 2$

$-2 \quad -2$

$18 = 1.5t$

$1.5 \quad 1.5$

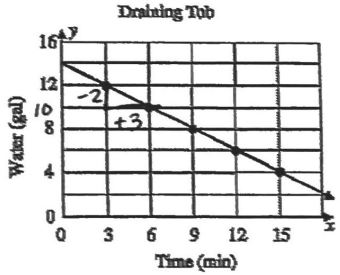
$12 = t$

12 minutes

17. Is the equation $y = \frac{4}{x}$ linear or nonlinear? Show work or explain. *(3 pts)*

non-linear, x cannot be in the denominator

18. The graph shows the amount of water in a bath tub as a function of time. *(3 pts)*



Calculate the rate of change. Explain what the rate of change and y-intercept means in context to the situation.

rate of change $= \frac{-2 \text{ gal}}{3 \text{ min.}}$ lose 2 gal. every 3 minutes

y-int $= (0, 14)$ = started with 14 gallons

You have recently begun researching phone billing plans. Phone Company A charges a flat rate of $75 a month. A flat rate means that your bill will be $75 each month with no additional costs. The billing plan for Phone Company B is a linear function of the number of texts that you send that month. That is, the total cost of the bill changes each month depending on how many texts you send. The table below represents some inputs and the corresponding outputs that the function assigns.

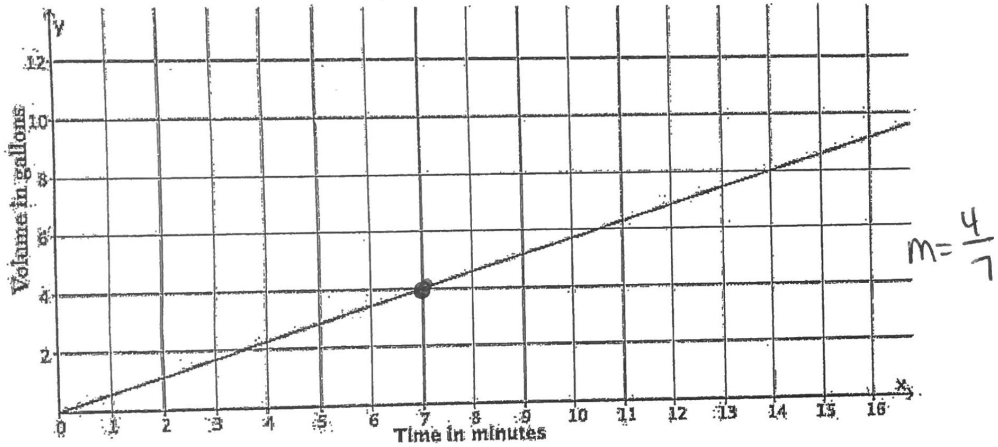
Input (number of texts)	Output (cost of bill in dollars)
50	50
150	60
200	65
500	95

+100 (50 → 150) +10 ; +10 = 75 ; 300 = 100+

At what number of texts would the bill from each phone plan be the same? At what number of texts is Phone Company A the better choice? At what number of texts is Phone Company B the better choice?

300 - same

The function that gives the volume of water, y, that flows from Faucet A in gallons during x minutes is a linear function with the graph shown. Faucet B's water flow can be described by the equation $y = \frac{5}{6}x$, where y is the volume of water in gallons that flows from the faucet during x minutes. Assume the flow of water from each faucet is constant. Which faucet has a faster rate of flow of water? Each faucet is being used to fill a tub with a volume of 50 gallons. How long will it take each faucet to fill its tub? How do you know?



m = 4/7

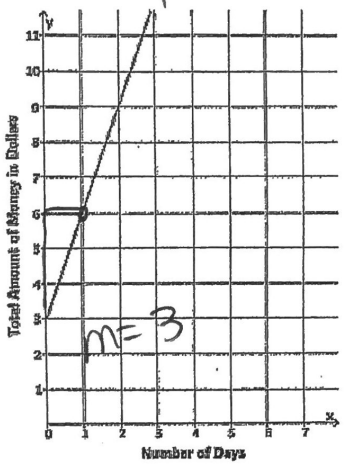
Suppose the tub being filled by Faucet A already had 15 gallons of water in it, and the tub being filled by Faucet B started empty. If now both faucets are turned on at the same time, which faucet will fill its tub fastest?

Faucet B = faster

Two people, Adam and Bianca, are competing to see who can save the most money in one month. Use the table and the graph below to determine who will save the most money at the end of the month. State how much money each person had at the start of the competition. (Assume each is following a linear function in his or her saving habit.)

Adam's Savings:

y = 3x + 3



Bianca's Savings:

y = 3x + 2 m = 3

Input (Number of Days)	Output (Total amount of money in dollars)
5	17
8	26
12	38
20	62

0 → 2 (−5) ; −15 ; +3 (5 → 8) 9 ; +4 (8 → 12) 12 ; +8 (12 → 20) 24

Adam - start w/ 3
end of month: 3(30)+3 = 93

Bianca - start w/ 2
end of month: 3(30)+2 = 92

The local park needs to replace an existing fence that is 6 feet high. Fence Company A charges $7,000 for building materials and $200 per foot for the length of the fence. Fence Company B charges are based solely on the length of the fence. That is, the total cost of the 6-foot high fence will depend on how long the fence is. The table below represents some inputs and their corresponding outputs that the cost function for Fence Company B assigns. It is a linear function.

Input (length of fence in feet)	Output (cost of bill in dollars)
100	26,000
120	31,200
180	46,800
250	65,000

+20 (100 → 120) 5200 ; +60 (120 → 180) 15600

A = 200x + 7000

B = 260x

a. Which company charges a higher rate per foot of fencing? How do you know?

B - higher slope

At what number of the length of the fence would the cost from each fence company be the same? What will the cost be when the companies charge the same amount? If the fence you need were 190 feet in length, which company would be a better choice?

Cost be the same?

$200x + 7000 = 260x$

$-200x \quad\quad -200x$

$\frac{7000}{60} = \frac{60x}{60}$

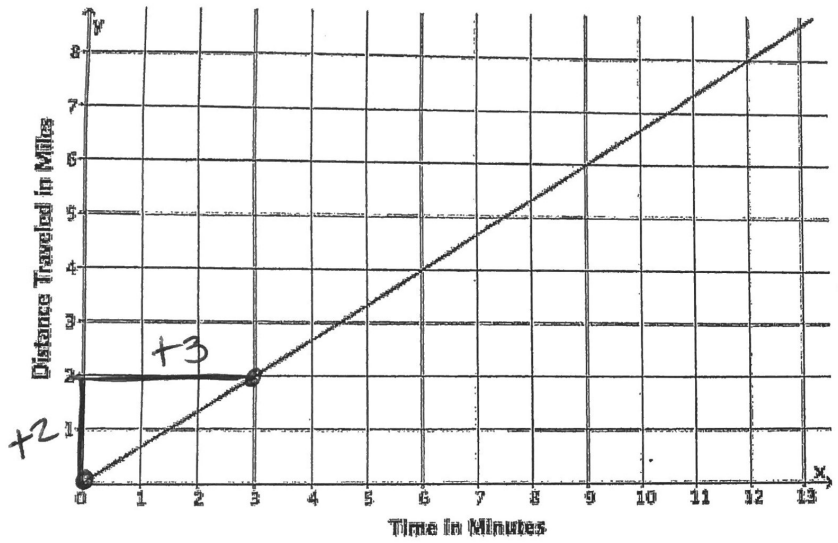
$\$117 \approx x$

16

The graph below represents the distance in miles, y, Car A travels in x minutes. The table represents the distance in miles, y, Car B travels in x minutes. It is moving at a constant rate. Which car is traveling at a greater speed? How do you know?

CAR B because $\frac{5}{6} > \frac{2}{3}$ └ rate = slope

Car A:



$m = \frac{y}{x} = \frac{2}{3}$

Car B:

Time in minutes (x)	Distance in miles (y)
15	12.5
30	25
45	37.5

+30 (+15, +15) +25 (+12.5, +12.5)

$\frac{y}{x} = \frac{12.5}{15}$ avoid fractions!

$\frac{y}{x} = \frac{25}{30} = \frac{5}{6}$

The equation $y = 123x$ describes the function for the number of toys, y, produced at Toys Plus in x minutes of production time. Another company, #1 Toys, has a similar function, also linear, that assigns the values shown in the table below. Which company produces toys at a slower rate? Explain.

└ slower rate = less slope

Time in minutes (x)	Toys Produced (y)
5	600
11	1,320
13	1,560

+6 → +720

$m = \frac{y}{x} = \frac{720}{6} = \frac{120}{1}$

Toys Plus slope = 123

#1 Toys slope = 120

A hose is used to fill up a 1,200 gallon water truck. Water flows from the hose at a constant rate. After 10 minutes, there are 65 gallons of water in the truck. After 15 minutes, there are 82 gallons of water in the truck. How long will it take to fill up the water truck? Was the tank initially empty?

About 344 min └ no, had 31 gal.

A train is traveling to New York City. The first car holds 150 people, the second car holds 175, the third car holds 200, and so on. Assuming the pattern continues, what function can be used to find the total number of passengers in train car x? see other page

X (min)	Y (gallons)
10	65
15	82

+5 → +17

Fill up the truck = 1200 gal.

Slope = $\frac{17}{5}$

Y-int:

X	Y
0	?
10	65
15	82

-10 → -34; +5 → +17

65 − 34 = 31

equation: $y = \frac{17}{5}x + 31$

$1200 = \frac{17}{5}x + 31$

$-31 \quad -31$

$1169 = \frac{17}{5}x$

$\cdot \frac{5}{17} \quad \cdot \frac{5}{17}$

$343.8 = x$