Name: _____Key_____ Date: _____ Block: _____

Outcome C/E/F Practice Packet

Determine if the following relations are functions and **explain why**.

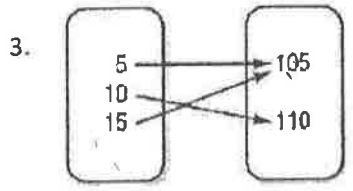1.

x	y
-2	-1
-2	1
-1	0
1	0
2	1

No, -2 cannot go to both -1 and 1

2.
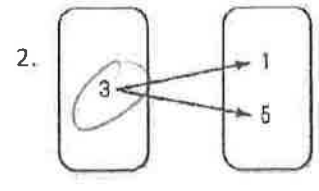
No, 3 cannot go to both 1 & 5

3.

5 → 105
10 → 105
15 → 110

yes, each input has one output
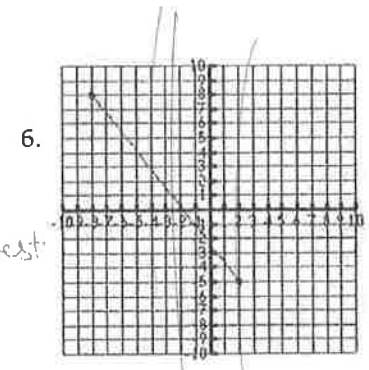
4.

x	y
-3	0
-1	-1
0	0
2	-2
3	4

yes, each input has one output

5.
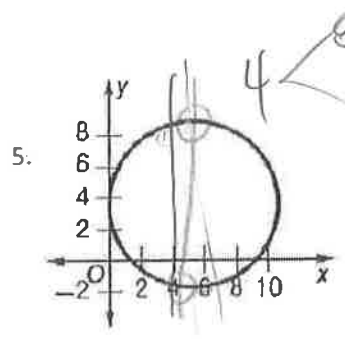
No, does not pass the vertical line test

6.

yes, passes the vertical line test

7. Write an equation of a line that has a negative slope.

$y = -2x + 1$ has to be a negative # here

8. Does the following scenario have a positive or negative slope? Explain your answer.

Pete started the summer with $100 dollars and earned 20 dollars a week mowing the lawn.

positive slope, earned means he gets more money total

9. Determine the rate of change for each function.
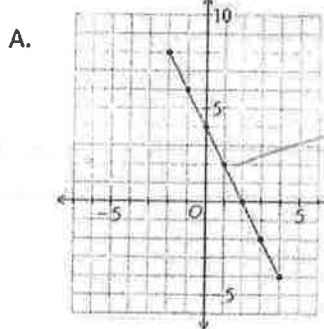
A. $y = 4x - 3$

$= \boxed{4}$

B.

x	y
1	4
2	7
3	10
4	13

+1 ... +3

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

10. Which function *from problem number 9* has a greater rate of change?

$\boxed{A}$

11. Determine the rate of change for each function.

A.

$(1,2)$ $(0,4)$
$x_1\ y_1$ $x_2\ y_2$

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{4-2}{0-1} = \frac{2}{-1}\ \boxed{-2}$

B. $y = \frac{1}{2}x + 7$

$\boxed{\frac{1}{2}}$

12. Compare the functions *from problem number 11* using <, >, or =.

$|-2| = 2$ $\boxed{2 > \frac{1}{2}}$ $\bigcirc{-2}$

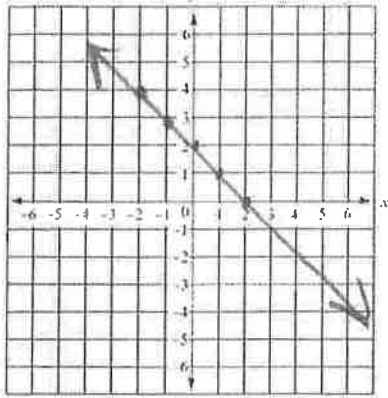13. Determine which equations are linear functions and explain your reasoning.

$y = \frac{x+9}{2}$

Equation	Linear? YES or NO	Explain your reasoning
$y = 3x + 7$	Yes	$y = mx + b$ ~~exponent on x is 1~~
$y = x^2 + 3$	NO	x is squared
$y = 4x^3$	No	x is cubed
$y = 2$	yes	exponent on x is 1

$y = 0x + 2$ (slope is zero)

Graph the slope of the line. Identify the y-intercept and graph it. Identify the slope; write it as a fraction and then using the y-intercept graph the rise/run.
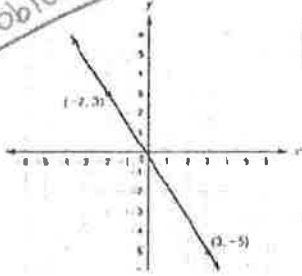
14. $y = -x + 2$
$m = -1$ $b = 2$

x	$-1x + 2$	y	
-2	$-1(-2)+2$	4	$(4, -2)$
-1	$-1(-1)+2$	3	$(-1, 3)$
0	$-1(0)+2$	2	$(0, 2)$
1	$-1(1)+2$	1	$(1, 1)$
2	$-1(2)+2$	0	$(2, 0)$

15 Write an equation in equation in slope-intercept form to represent the graph. Identify slope, the y-intercept and the then write the equation y = mx+b.

Challenge Problem

$(-2, 3)$ $(3, -5)$
$x_1\ y_1$ $x_2\ y_2$

$\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-5 - 3}{3 - (-2)} = \boxed{\frac{-8}{5}}$ m

$\boxed{y = \frac{-8}{5}x - \frac{1}{5}}$

$y = mx + b$

$3 = \frac{-8}{5}\left(\frac{-2}{1}\right) + b$

$\frac{-8}{5} \cdot \frac{-2}{1} = \frac{16}{5}$

$3 = \frac{16}{5} + b$
$-\frac{16}{5}$ $-\frac{16}{5}$

$3 - \frac{16}{5}$

$\frac{15}{5} - \frac{16}{5} = \boxed{\frac{-1}{5} = b}$

16. Jessica and Jan both run on the weekends to stay fit. Which person runs at a faster pace?

X	Time (h)	1	2	3
Y	Miles Ran	5	10	15

Jessica
+5

$\frac{\Delta y}{\Delta x} = \frac{5\ \text{miles}}{1\ \text{hr.}}$

Jessica does

Jan

y = 3.5x
x = time (h)
y = miles

$\frac{3.5\ \text{miles}}{1\ \text{hr.}}$

17. **Graph** the proportional relationship between the two quantities and **describe** how the unit rate is represented on the graph. Include at least 3 points on your graph.
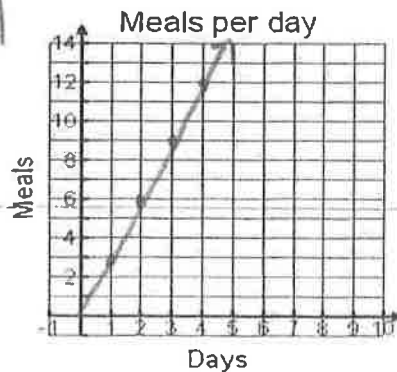
For every day there are 3 meals.

x days	1	2	3	4
y meals	3	6	9	12

a. What is the unit rate?

$\frac{\Delta y}{\Delta x} = \boxed{\frac{3\ \text{meals}}{1\ \text{day}}}$

b. Graph it.

Meals per day

c. How is it represented on the graph?

goes up 3 for every one unit right.

18. The graph pictured represents the cost of shampoo at a local store. Which table(s) represents a **cheaper** price for shampoo per ounce than the graph? Find the rate of change for all four representations and then determine which is cheaper.

← per 1 oz

a.

Oz	Cost
0.5	1
1	2
1.5	3
2	4

$\frac{\Delta y}{\Delta x} = \frac{\$1}{0.5\ oz}$

$0.5\overline{)1.0}$ $\frac{\$2}{1\ oz}$

b.

Oz	Cost
2	1
4	2
6	3
8	4

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

$2\overline{)10}$ $\frac{\$0.5}{1\ oz}$ ← cheapest

c.

Oz	Cost
1	2
2	4
3	6
4	8

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

Cost

$(0,0)$ $(1,1)$ oz
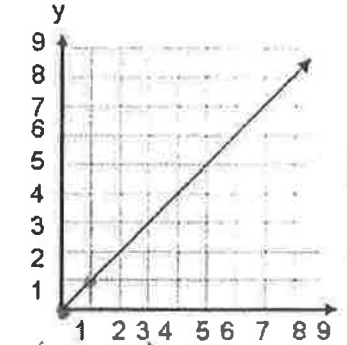
$\frac{y_2-y_1}{x_2-x_1} = \frac{1-0}{1-0} = \frac{1}{1}$ $\frac{\$1}{1\ oz}$

19. Two stores in town sell turkey by the pound. Both are represented below. Which store offers the better deal? Explain why.
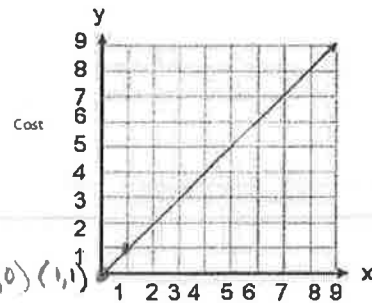
Store A

y = 1/2x
x = weight (lbs)
y = cost

$\frac{\$0.5}{1\ b}$ better deal

Store B

Cost

$(0,0)$ $(1,1)$ Weight (lbs)

$\frac{\Delta y}{\Delta x}$ $\frac{1-0}{1-0} = \frac{1}{1}$ $\frac{\$}{1\ lb}$
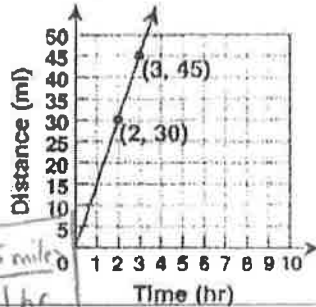
20. Compare the 2 scenarios to determine which cyclist travels at a greater speed and explain why.

Scenario 1

$(3,45)$ $(2,30)$
$x_1\ y_1$ $x_2\ y_2$

$\frac{\Delta y}{\Delta x} = \frac{y_2-y_1}{x_2-x_1} = \frac{30-45}{2-3}$

$= \frac{-15}{-1} = 15\ miles / 1\ hr$

Cyclist's Distance

Scenario 2

$y = 20x$ 20 miles / 1 hr ← because 20 > 15
x is time in hours
y is distance in miles

21. Which representation(s) match the earnings represented in the graph?

A.

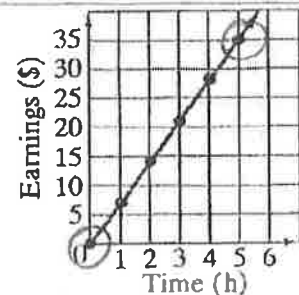| x	0	1	2
y	0	5	15

+5

B. y = 7x

C. y = $\frac{3}{2}$x

$(0,0)$ $(5,35)$
$x_1\ y_1$ $x_2\ y_2$

$\frac{y_2-y_1}{x_2-x_1} = \frac{35-0}{5-0} = \frac{35}{5} = \frac{\$7}{1\ hr}$

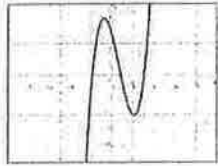22) Given the following ordered pairs, write an equation to represent their linear relationship.

(3, 1) (6, 2) (9, 3) (12, 4) (15, 5)
x_1 y_1 x_2 y_2

$$\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2-1}{6-3} = \frac{1}{3}$$

m

$y = mx + b$
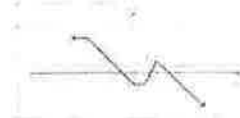↓
$1 = \frac{1}{3}(3) + b$

$1 = 1 + b$

$0 = b$

23) Describe the functions below

A)

Increasing Non linear

B)

decreasing
Nonlinear

C)
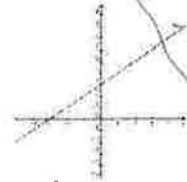
increasing
linear

24) Your soccer team is having a bake sale to raise money to go to a tournament in Florida. Each baked good cost $1.50. One generous person decided to give you tip of $10.

a. Write a equation to represent this situation $y = 1.5x + 10$

b. What value represents the rate of change? $1.5

c. What value represent the initial value? $10

25) For the 8th grade trip we go to Brunswick Zone! The following table represents how much money is on a Brunswick card after playing arcade games.

Games Played (x)	Money Left (y)
8	24
10	20
12	16
14	12

$(8, 24)$ $(10, 20)$
x_1 y_1 x_2 y_2

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{20-24}{10-8} = \frac{-4}{2} = -2$$

A) Describe how the amount of money left changes each time you play 1 game.

decreases by 2 dollars

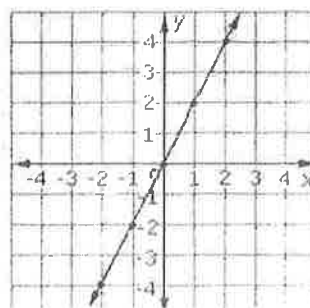B) Based on that amount, how much money was initially on the card before playing any arcade games? $40

$y = mx + b$
↓
$24 = -2(8) + b$
$24 = -16 + b$
$+16$ $+16$
$40 = b$

26) Use the graph below to answer the following questions

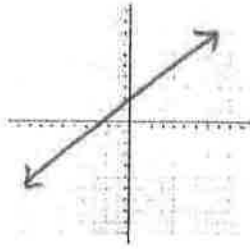a. What is the rate of change?

$m = 2$

b. What is the initial value?

$b = 0$

$(0,0)$ $(1,2)$

$\frac{2-0}{1-0} = 2$
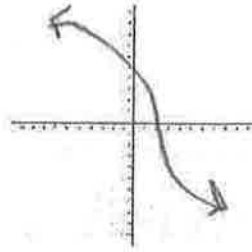
$y = mx + b$
↓
$b = 2(0) + b$

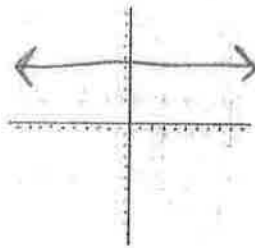For problems 10- 14 sketch a graph that exhibits the described features.

27) Linear, increasing function

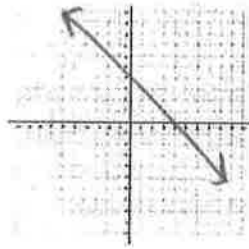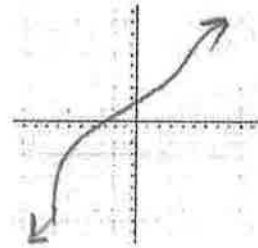**29) nonlinear, decreasing function**
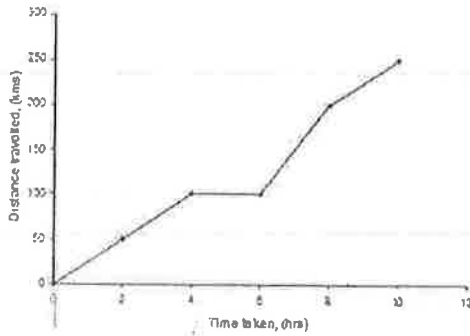
28) Constant function   **30) linear, decreasing function**   **31) nonlinear, increasing function**

32)

During interval 0-4 hours, the distance traveled is...

a) Increasing   b) decreasing   c) constant

During interval 4-6 hours, the distance traveled is...

b) Increasing   b) decreasing   c) constant

33) Kelly needs to go get a drink during science class. She walks to the drinking fountain, then stops to take a drink. She looks at the clock and realized the bell is going to ring so she quickly jogs back to class. Draw a speed vs. time graph to represent this situation