Monday, April 15th

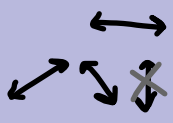
Turn in your homework (day 3 practice) to Ms. Shaffer.

Pick up a piece of purple paper off the back table. Fold it in half. Label one half "linear" and one half "exponential" at the top.

Linear

$y = mx + b$ ← y-int (starting value)

↓ slope (+ or − pattern)

- constant rate of change (slope)
- straight line 
- goes on forever
- must pass vertical line test

Slope: $m = \frac{y_2 - y_1}{x_2 - x_1}$

Standard Form: $Ax + By = C$

Exponential

$y = a(b)^x$

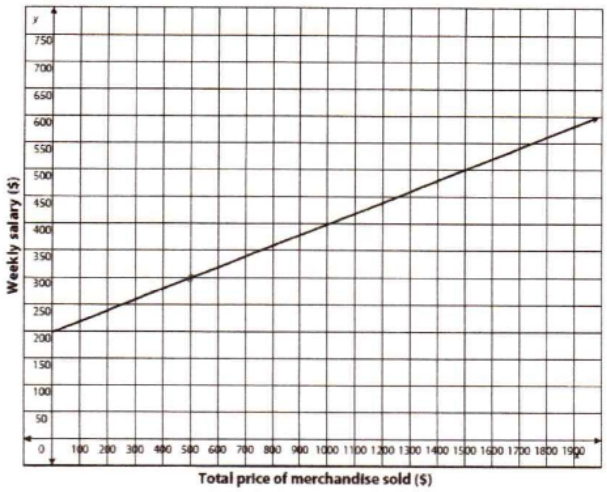
↙ y-int (starting value)

↘ constant ratio (multiplication pattern)

- increasing rate of change (growth) or decreasing rate of change (decay)
- must pass vertical line test
- goes on forever
- never crosses asymptote
- ↑ or ↓ by %

Unit 13 – Day 3 Practice Name: Key

1. Your employer has offered two pay scales for you to choose from. The first option is to receive a base salary of $250 a week plus 15% of the price of any merchandise you sell. The second option is represented in the graph below. Compare the properties of the functions.



First Option

y-intercept: $250

slope: .15

Second Option

y-intercept: $200

slope: (0, 200) (500, 300)

$\frac{300-200}{500-0} = \frac{100}{500} = \frac{1}{5} = .2$

a) Which function has a higher starting salary?

The first option

b) Which function has a higher commission rate?

Opt 1: .15 = 15%

The second option Opt 2: .2 = 20%

2. Compare the properties of the functions below in terms of the problem situation:

Rental Store A

A rental store charges $40 to rent a steam cleaner, plus an additional $4 per hour.

$y = 4x + 40$

a. Which function has a higher starting price and why? Rental Store A; $40 is more than $25 (y-int)

Rental Store B

The table below shows the total cost in dollars to rent a steam cleaner at a different rental store, g(x) represents the total cost after x hours.

Hours (x)	Total cost (g(x))
3	46
4	53
5	60
6	67

+7

0 | 25
1 | 32
2 | 39
3 | 46

-7

b. Which function has a higher rental cost per hour and why? Rental Store B; $7 per hr is more than $4 per hr (slope)

3. Compare the properties of the functions below in terms of the problem situation:

Job Offer A
Jazlynn received a job offer with a starting salary of $32,000 and a 1.5% increase every year.

32000 (1+.015)^x

Job Offer B
She received a second job offer represented by the following equation:
$f(x) = 30{,}000(1+0.02)^x$.

.02 = 2%

a. Which job has a higher starting salary?

Job Offer A → y-int

b. Which job has a higher pay increase?

Job Offer B → constant ratio

4. A bicycle store has approximately 200 bicycles in stock. The store owner is considering plans for expanding its inventory.

- Plan A: Increase by 30 bicycles per year
- Plan B: Increase by 10% each year

a. What type of function does Plan A represent?

linear

b. Create a function to represent Plan A:

$y = 30x + 200$

c. What type of function does Plan B represent?

exponential

b. Create a function to represent Plan B:

$y = 200(1.1)^x$ → 1+.1

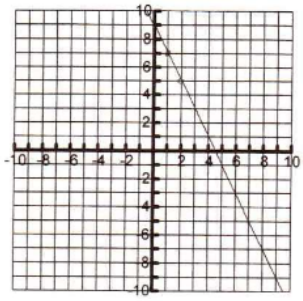
e. When will the number of bicycles under Plan B exceed the number of bicycles under Plan A?

Year 9

Unit 13 – Day 6 Practice
Name: answer key Date: _____

Comparing Linear Functions

1. The functions f(x) and g(x) are described below. Compare the rate of change and intercepts of each. f(x) and g(x) have the same rate of change; f(x) has a larger y-int.



m = -2
x-int : (4.5, 0)
y-int : (0, 9)
(1, 7) (2, 5)
$m = \frac{5-7}{2-1} = -2$

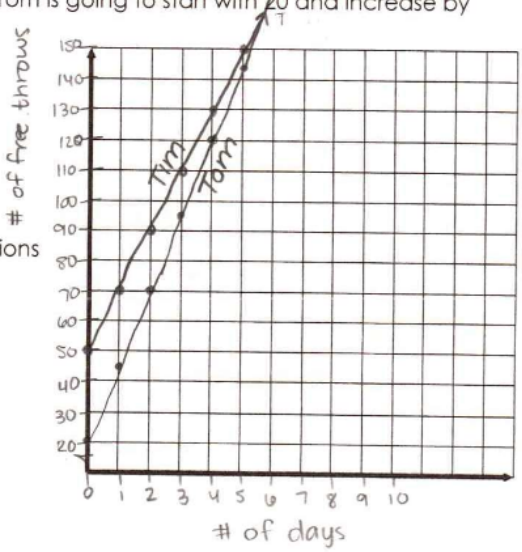
x	g(x)
-2	-10
-1	-8
0	-6
1	-4
2	-2
3	0

m = 2
x-int : (3, 0)
y-int : (0, -6)
(-2, -10) (-1, -8)
$m = \frac{-8+10}{-1+2} = 2$

2. Tim and Tom are twins. They both want to become good free throw shooters. They each devise a separate workout plan to get better at shooting free throws. Tim is going to start with 50 shots and increase by 20 each day. Tom is going to start with 20 and increase by 25 each day.

a) Write a function for each person.
Tim: y = 20x + 50
Tom: y = 25x + 20

b) Graph each function and label the two functions



c) Where do they intersect?
(6, 170)

d) What does this intersection mean?
On day 6, they both shoot 170 free throws.

e) When will Tim shoot more free throw? before day 6.
When will Tom shoot more? after day 6

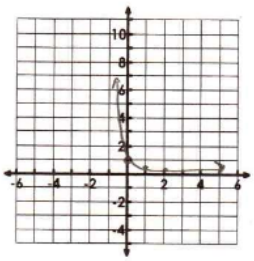
Comparing Exponential Functions

3. Graph the two functions. Which function has a greater rate of change over the interval [0, 3]? How do you see that in the graph? Which function has the greater y-intercept?

$f(x) = \left(\frac{1}{2}\right)^x$

x	y
0	1
1	.5
2	.25
3	.13

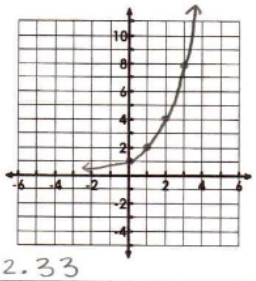
(0,1)(3,.13) $\frac{.13-1}{3-0} = -.29$



$g(x) = 2^x$

x	y
0	1
1	2
2	4
3	8

(0,1)(3,8) $\frac{8-1}{3-0} = 2.33$



Compare R.O.C. and y-int:
- same y-int
- g(x) has the greater rate of change

4. Jennifer has the choice of two bank accounts. She has $2,000 to invest.

Bank A: $A(x) = 2{,}000(1.05)^x$ **Bank B**: $B(x) = 2{,}000(1.08)^x$

a) Compare the rate of change for the two banks over the first 10 years.

A: (0, 2000)(10, 3257.79) $\frac{3257.79-2000}{10-0} = 125.78$

B: (0, 2000)(10, 4317.85) $\frac{4317.85-2000}{10-0} = 231.79$

Bank B has the larger rate of change.

b) Which account is better than the other? What part of the equation would indicate that this bank is better than the other?

Bank B; it is increasing by 8% and Bank A would increase by 5%

Comparing Linear and Exponential Functions

5. Jack and Renee are saving money to buy a new ipod. Jack saves 4 dollars each day. Renee saves 2 dollars the first day, 4 dollars the second day, 8 dollars the third, and so on.

a) Write a function that represents the number of dollars they save each day.

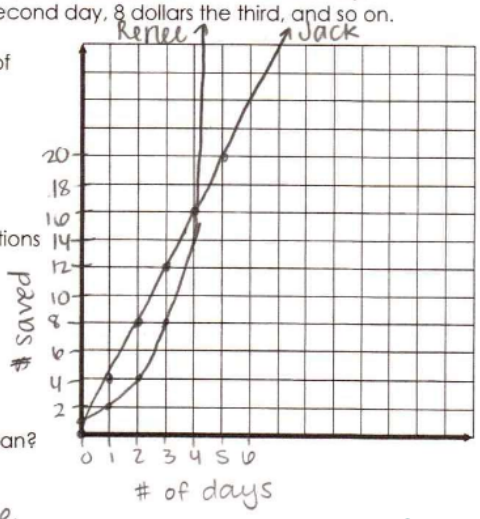
Jack: j(x) = 4x or 4x + 0

Renee: m(x) = 2^x or $1(2)^x$

b) Graph each function and label the two functions

x	y
0	0
1	4
2	8
3	12
4	16

x	y
0	1
1	2
2	4
3	8
4	16



c) When will they intersect? What does that mean?

(4,16) → On the fourth day, they both save $16.

0	1
1	2
2	4
3	8

2:2, ·2