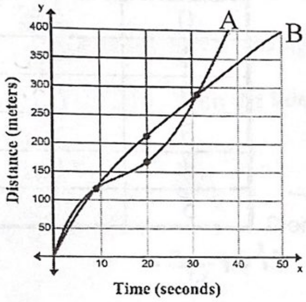
11-20-19

Name: ______________________ Date: __________

Rate of Change Homework

Below is the graph and table for 2 runners running the 400 meter hurdles race.



Time	Runner A	Runner B
0	0	0
9	120	120
20	168	213
31	287	287

1. Which runner has a faster average speed for the first 9 seconds?

2. Which runner has a faster average speed from 9 to 20 seconds?

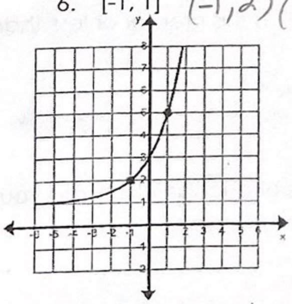
3. Which runner has a faster average speed from 20 to 31 seconds?

4. Which runner has a faster average speed from 9 to 31 seconds?

5. Which runner wins the race? How do you know?

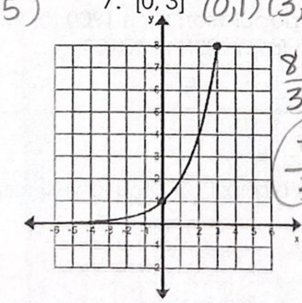
Find the average rate of change for each of the following graphs over the given interval.

6. [-1, 1] (-1,2)(1,5)



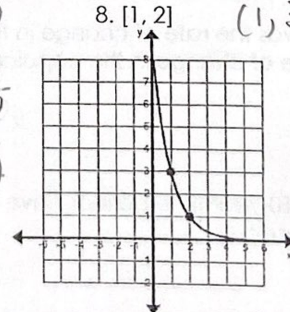
$\frac{5-2}{1-(-1)} = \frac{3}{2}$

7. [0, 3] (0,1)(3,8)



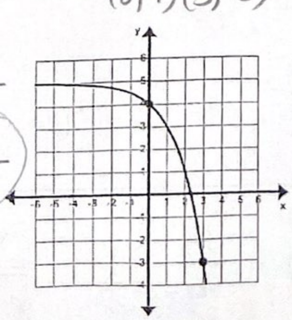
$\frac{8-1}{3-0}$ $\frac{7}{3}$

8. [1, 2] (1,3)(2,1)



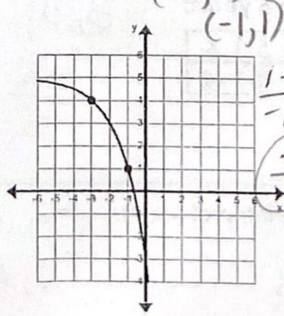
$\frac{1-3}{2-1} = \frac{-2}{1}$

9. [0, 3] (0,4)(3,-3)



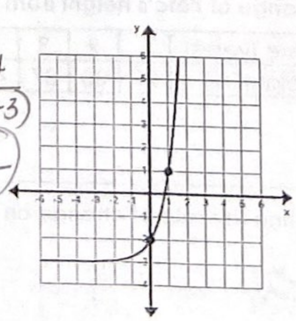
$\frac{-3-4}{3-0}$ $\frac{-7}{3}$

10. [-3, -1] (-3,4)(-1,1)



$\frac{1-4}{-1-(-3)}$ $\frac{-3}{2}$

11. [0, 1] (0,-2)(1,1)



$\frac{1-(-2)}{1-0}$ $\frac{3}{1}$

Suppose 25 flour beetles are left undisturbed in a warehouse bin. The beetle population doubles in size every week. The equation $P(x) = 25 \bullet 2^x$ can be used to determine the number of beetles after x weeks. Complete the table.

Week	Population	
0	25	$25 \cdot 2^0$
1	50	$25 \cdot 2^1$
2	100	$25 \cdot 2^2$
3	200	$25 \cdot 2^3$
4	400	$25 \cdot 2^4$
5	800	$25 \cdot 2^5$

12. Calculate the average growth rate between weeks 1 and 3.

(1,50) (3,200) $\frac{200-50}{3-1} = \frac{150}{2} = 75$

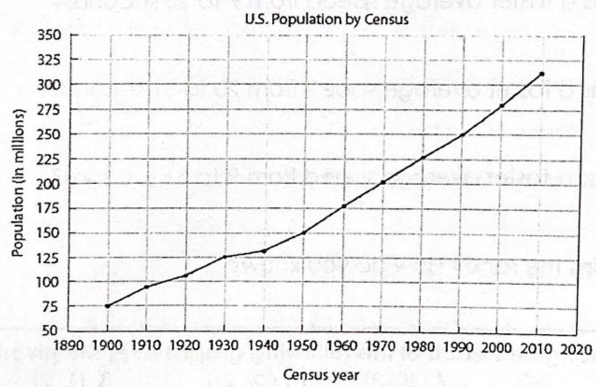
13. Calculate the average growth rate for the first five weeks [0, 5].

(0,25) (5,800) $\frac{800-25}{5-0} = \frac{775}{5} = 155$

14. Which average growth rate is higher? Why do you think it is higher?

[0, 5] The further you go, the larger the change.

The graph below shows the United States population from 1900 to 2010, as recorded by the U.S. Census Bureau.



15. What was the rate of change in the population from 1900 to 2000? Is this greater or less than the rate of change in the population from 2000 to 2010?

16. Which 10-year time periods have the highest and the lowest rates of change? How did you find these?

Find the rate of change of Pete's height from 3 to 5 years.

17.

Time (years)	1	2	3	4	5	6
Height(in.)	27	35	37	42	45	49

(3, 37) (5, 45)

$\frac{45-37}{5-3} = \frac{8}{2} = 4$

For $f(x) = x^2 - 2$, find the rate of change on the interval [-2, 4].

18.

$(-2)^2 - 2 = 4 - 2 = 2$

$4^2 - 2 = 16 - 2 = 14$

(-2, 2) (4, 14)

$\frac{14-2}{4-(-2)} = \frac{12}{6} = 2$

11-21-19

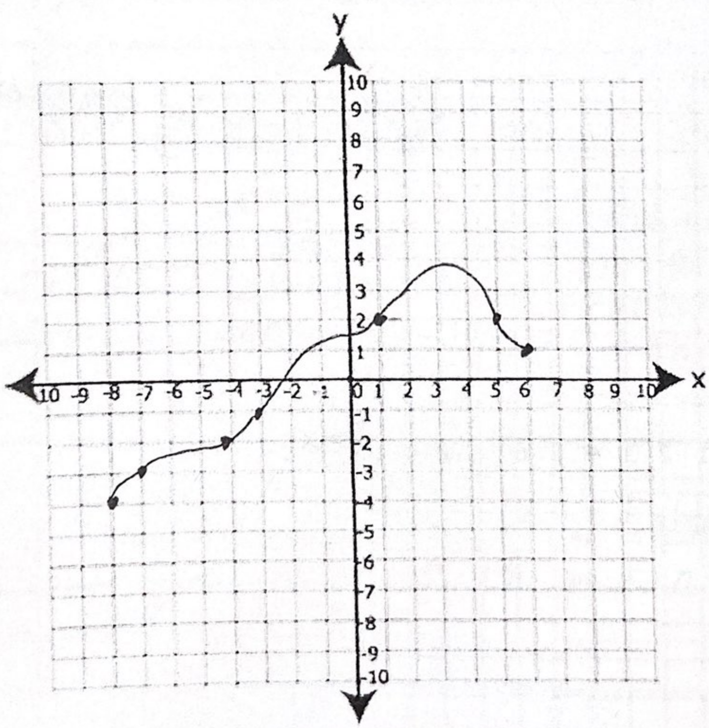
Coord Alg   Quiz 3.2 AROC-B   Woodworth   NAME_______________________pd___

Find the average rate of change for the following functions over the given intervals.

1. $f(x)=2^x$ on the interval [-1,2] $(-1, .5)$ $(2,4)$

$\frac{4-.5}{2+1} = \frac{3.5}{3} \rightarrow \frac{7}{6}$

2. $g(x)$ is shown on the graph below. Find AROC on [-3,-1]



$(-3,-1)$
$(-1,1)$

$\frac{1+1}{-1+3} = \frac{2}{2}$

12-2-19

AROC: Slope between 2 points.

slope formula: $\frac{y_2 - y_1}{x_2 - x_1}$

- must find 2 points when only given x-values.

ex: [2,5] * need either a formula, a table, or a graph to find the y-values

(2,)

(5,)

$f(x) = 2x - 4$

$f(2) = 2(2) - 4$

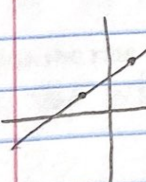
$y = 0$

x	f(x)
2	0
5	6

y-value for f(5)

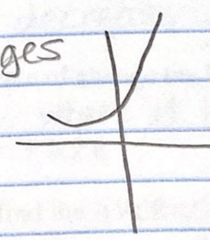
If given a graph, you can see the coordinate points to find the y-values

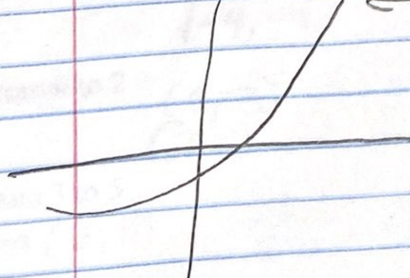
ROC: constant or variable



ROC is always the same on a line.

ROC changes on a curved line.





← steepest

ROC is variable growth b/c it is increasing

12-2-19

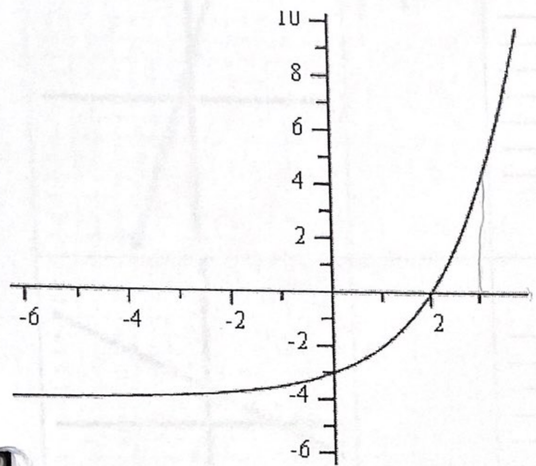
AVERAGE RATE OF CHANGE

Name____________________________

1.) If somebody were to ask you the rate of change for a curve, you would have to say that the rate of change was…

Exponential Growth

Here's the graph of $\boxed{y = 2^x - 4}$



1.) Why is this graph exponential growth?

b/c it is increasing

2.) Where is the rate of change the highest? Explain.

At the top where it is steepest.

3.) To confirm, find the AVERAGE rate of change for each interval:

a.) from -6 to -4 $(-6,-4)$ $(-4,-4)$ $= 0$

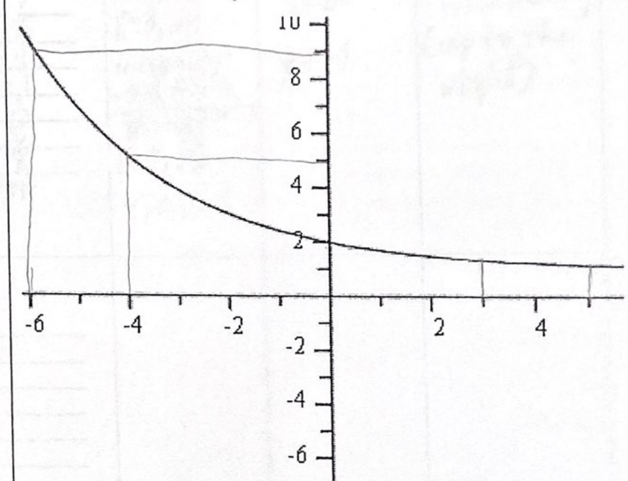
b.) from 0 to 2 $(0,-3)$ $(2,0)$ $\frac{-3-0}{0-2} = \frac{3}{2}$

c.) from 3 to 5

plug into the equation $2^x - 4$ $(3,4)$ $(5,28)$ $\frac{28-4}{5-3} = \frac{24}{2} = \frac{12}{1}$

Exponential Decay

Here's the graph of $\boxed{y = .7^x + 1}$



4.) Why is this graph exponential decay?

b/c it is decreasing

5.) Where is the rate of change the highest? Explain.

top left is where it is decreasing at highest rate

6.) To confirm, find the AVERAGE rate of change for each interval:

a.) from -6 to -4 $(-6,9)$ $(-4,5)$ $\frac{5-9}{-4+6} = \frac{-4}{2} = \frac{-2}{1}$

b.) from 0 to 2 $(0,2)$ $(2,$

c.) from 3 to 5

What is the **average rate of change** for each function over the given interval?

x	f(x)
3	15
4	18
5	21
6	24

x	g(x)
0	1
1	3
2	9
3	27

7.) f(x) from 3 to 5

8.) f(x) from 4 to 6

9.) g(x) from 0 to 2

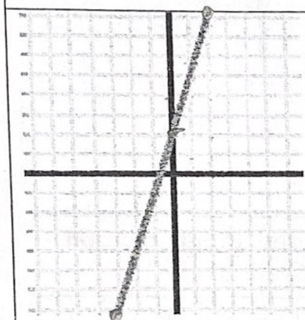
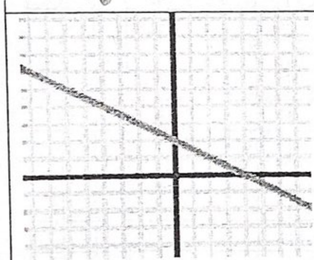
10.) g(x) from 2 to 3

12-3-19

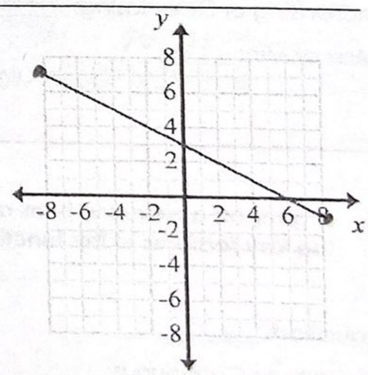
Woodworth CALG U3L3.1 Characteristics

Name: Date:

Characteristics of Linears Practice

Graph	Equation	Table	Domain & Range	Intercepts	Increasing or Decreasing
	$y=\frac{3}{1}x+2$	x / y: -3 / -7 -2 / -4 -1 / -1 0 / 2 1 / 5 2 / 8 ~~3 / 11~~	~~Domain~~ interval notation: [-3,2] inequality: $-3 \le x \le 2$ Range: [-7,8] $-7 \le y \le 8$	y=2 x=-1	increasing (up to the right)
		x / y: -3 / -2 / -1 / 0 / 1 / 2 / 3 /			

1. Fill in the information for the graph.



Domain: [-8,8]

Range: [-1,7]

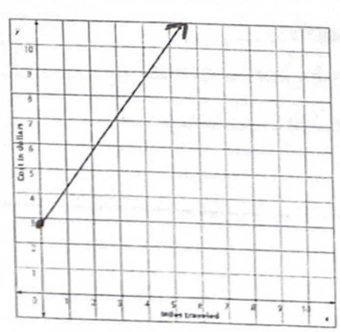
Intercepts: y=3 x=6

Increasing / Decreasing: decreasing

Max or Min: 7/-1

asking for a y-value!

2. A taxi company in Atlanta charges $2.75 per ride plus $1.50 for every mile driven. Write the equation for the line, and determine the key features of this function.



Equation: $y=\frac{3}{4}x+3$

Discrete or Continuous: C

Domain: $[0,\infty)$

Range: $[3,\infty)$

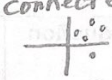
Intercepts: y=3

Increasing or Decreasing: I

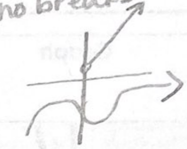
Max or Min: $3,\infty$

3. The cost of an air conditioner is $110. The cost to run the air conditioner is $0.35 per minute. Write the equation, and determine the key features of this function.

Discrete
separate; not connected; alone



Continuous
in a line; connected; no breaks



Minutes (x)	Cost in dollars ($f(x)$)
0	110.00
30	120.50
60	131.00
90	141.50
120	152.00

Equation: $y = .35x + 110$

Domain: ________

Intercepts: ________

Max or Min: ________

Discrete or Continuous: C

Range: ________

Increasing or Decreasing: ________

Rate of Change: $\frac{.35}{1}$

---

4. A ringtone company charges $15 a month plus $2 for each ringtone downloaded. Create a graph and then determine the key features of this function.

Equation: $y = \frac{2}{1}x + 15$

Discrete or Continuous: C

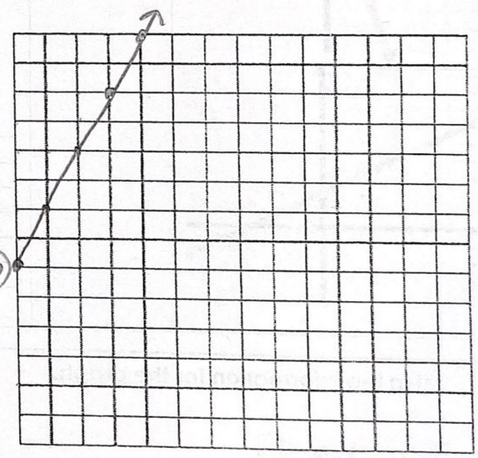
Domain: $[0, \infty)$

Range: $[15, \infty)$

Intercepts: $y = 15$

Increasing or Decreasing: I

Max or Min: $15, \infty$



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5. A gear on a machine turns at a rate of 3 revolutions per second. Write the equation, and determine the key features of this function.

Equation: ________

Discrete or Continuous: ________

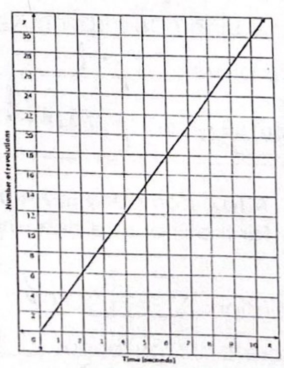
Domain: ________

Range: ________

Intercepts: ________

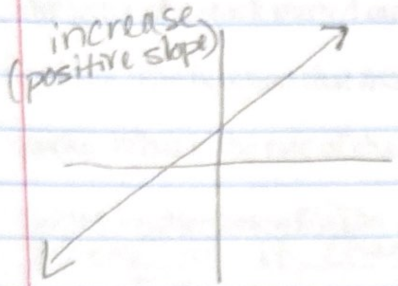
Increasing or Decreasing: ________

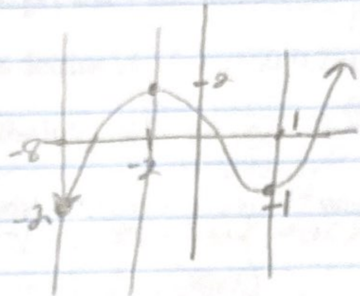
Max or Min: ________



12-4-19

Intervals of increase or decrease





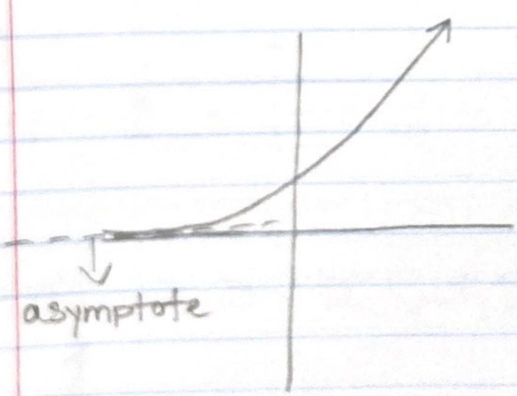
intervals of inc: $[-8,-2]$ $[-1,\infty)$

*only talking about x's

int. of dec.: $[-2,1]$

Asymptote: an imaginary line that a graph gets closer and closer to but never touches

*All exponential functions have asymptotes.



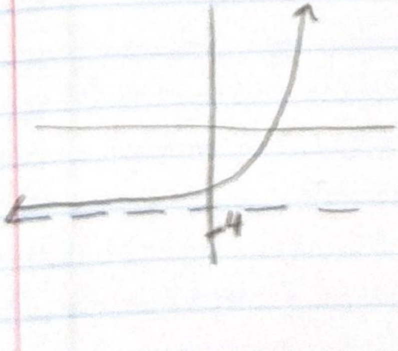
$y=2^x$

$f(x)=2^x$

Domain: $(-\infty,\infty)$

Range: $(0,\infty)$

*nvr touches so round parenthesis



R $(-4,\infty)$

12-4-19

Woodworth AROC/Charact Review NAME________________________________pd______

1.

The price of a stock started out at \$150 per share and has declined to 75% of its value every 2 weeks. The function that models this decline is $f(x)=150(0.75)^{\frac{x}{2}}$, where x represents time in weeks. What is the rate of change for the interval [1, 4]?

$x \rightarrow$ use 1 & 4

1. Get the point

$150(.75)^{\frac{1}{2}}$

$f(1)\ 150(.866)$
$= 130$

$f(x)=150(.75)^{\frac{4}{2}}$
$150(.5625)$
$=84$

(1, 130)
(4, 84)

2. Find the slope

$\frac{84-130}{4-1} = \frac{-46}{3}$

2. Is the function below linear or exponential and how do you know? What is AROC on [10, 30]?

Linear b/c it changes by a constant each time.

C° (x)	F° (f(x))
0	32
10	50
20	68
30	86
40	104

(10, 50)
(30, 86)

slope = $\frac{9}{5}$

3. Is the function below linear or exponential and how do you know? What is AROC on [12,36]

Exponential b/c the ROC is not constant.

Minutes (x)	Number of bacteria (f(x))
0	15
12	30
24	60
36	120
48	240

(12, 30)
(36, 120)

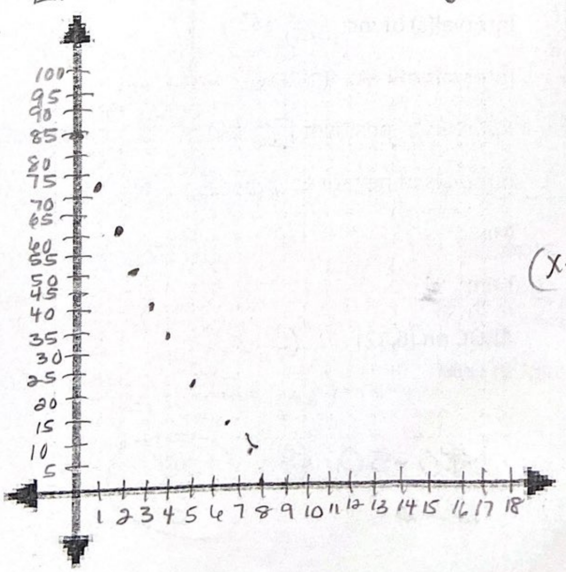
slope = $\frac{15}{4}$

$\frac{120-30}{36-12} = \frac{90}{24}$

4. You and your friends are out hiking. You start the hike with 84 pounds of food for the group and eat about 12 pounds each day. Graph this function below and identify the key features. Make the x axis days and the scale one day/unit. Make the y axis pounds of food remaining and the scale 5 pounds/unit.

Linear function b/c losing 12 lbs each day.

$y = -12x + 84$



Domain: {0, 1, 2, 3... 8}

Range: {0, 12, 24, ... 84}

Discrete or continuous? B/c there's not loss b/t the 12 lbs/day

Interval(s) of inc: none

x-values

Interval(s) of dec: [0, 8]

(x-values that are pos.)

Intervals of positive: [0, 8]

Intervals of negative: none

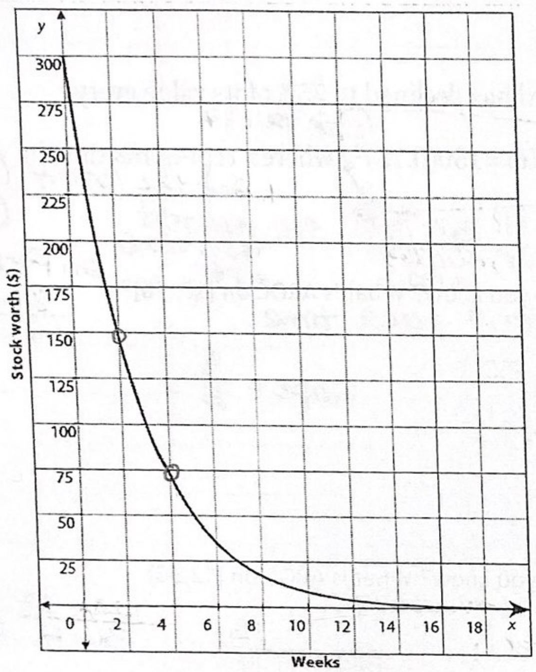
Max:

Min:

AROC on $\left[\frac{4.73}{7}, \frac{3\pi^2}{1}\right]$ -12

12-5-19

5. A stock is declining in value by 70% every two weeks. The stock started at $300. Use the graph to identify characteristics of this function:



Domain: $[0, \infty)$

Range: $(0, 300]$

Discrete or continuous? no breaks in the lin

Interval(s) of inc: none

Intervals of dec: $[0, \infty)$

Intervals of positive: $[0, \infty)$

Intervals of negative: none

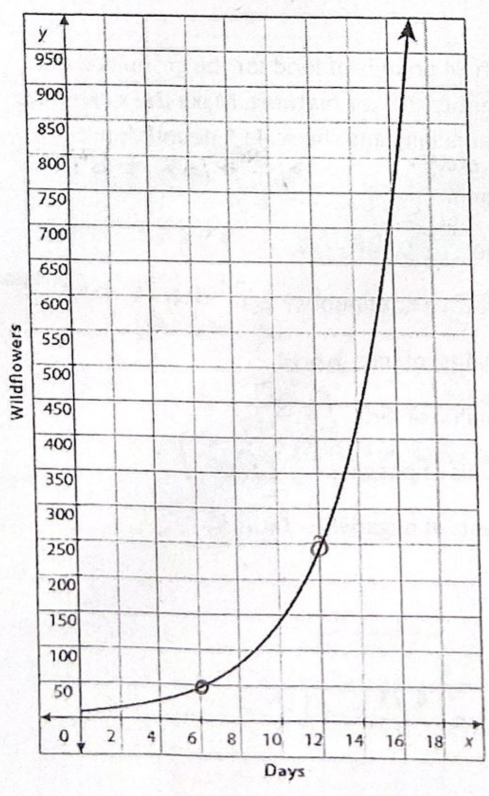
Max: 300

Min: 0

y-values

AROC on [2,4] (2, 150) (4, 75) $\frac{75-150}{4-2}$ $\frac{75}{2}$

6. A wildflower species triples in 4 days. A field started with 9 flowers in the spring. Identify the key characteristics of this function:



Domain: $[0, \infty)$

Range: $[9, \infty)$

Discrete or continuous?

Interval(s) of inc: $[0, \infty)$

Intervals of dec: none

Intervals of positive: $[0, \infty)$

Intervals of negative: none

Max: ∞

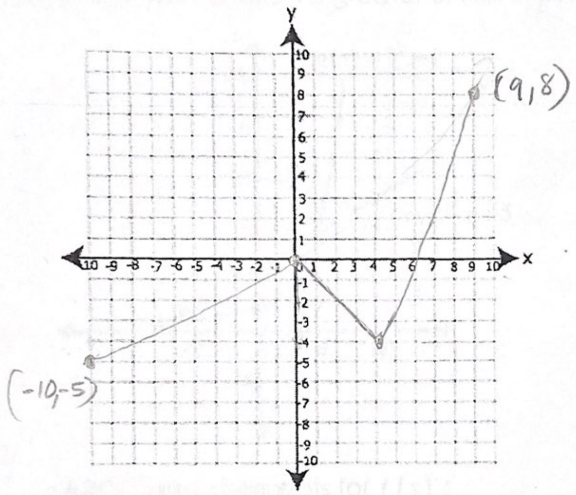
Min: 9

AROC on [6,12] (6, 50) (12, 250)

$\frac{250-50}{12-6}$ $\frac{200}{6}$ $\frac{100}{3}$

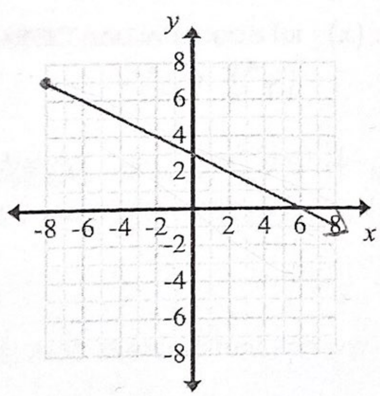
| 12-5-19 |

14. Sketch any function that increases on [-10, 0] and [4,9], decreases on [0,4], has a maximum of 8 and a minimum of -5.



15. **Fill in the information for each graph.**

a)



Domain: [-8, ∞)

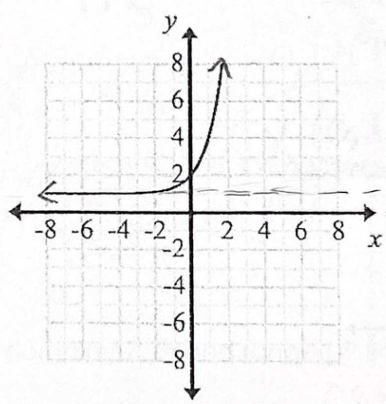
Range: (-∞, 7]

Intercepts: y = 3; x = 6

Inc/Dec: [-8, -∞) none

Max or Min: 7, -∞

b)



Domain: (-∞, ∞)

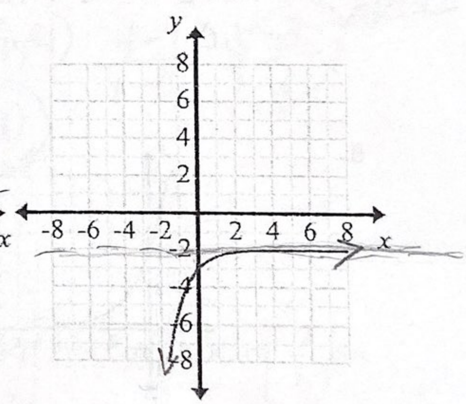
Range: (1, ∞)

Intercepts: y = 2

Inc/Dec: none (-∞, ∞)

Max or Min: ∞, 1

c)



Domain: [-∞, ∞)

Range: (-∞, -2)

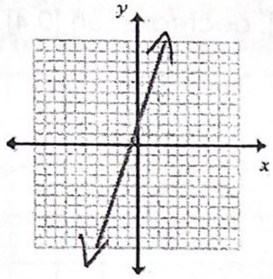
Intercepts: y = -3

Inc/Dec: none [-∞, ∞)

Max or Min: -2, -∞

16. **For each of the functions find the following information.**

A.



Domain: $(-\infty, \infty)$

Range: $(-\infty, \infty)$

x - intercept: -1

y- intercept: 2

Increasing: $(-\infty, \infty)$

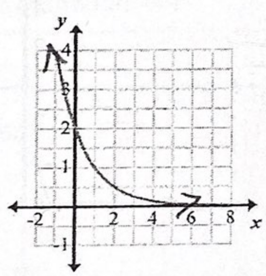
Decreasing: none

Rate of change over [-1, 2] $\frac{8}{3}$

$-1, 0$ $\quad$ $2, 8$

$\frac{8-0}{2+1} = \frac{8}{3}$

B.



Domain: $(-\infty, \infty)$

Range: $(\infty, 0)$

x - intercept: none

y- intercept: 2

Increasing: none

Decreasing: $(-\infty, \infty)$

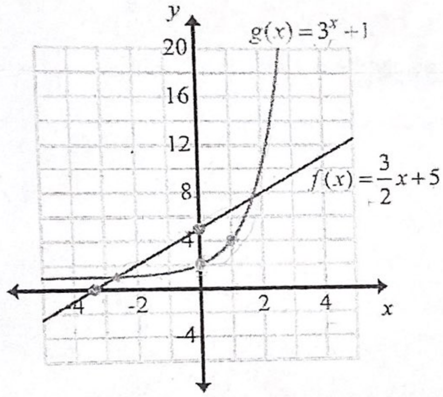
Rate of change over [-1, 2] -1

$(-1, 4)$ $(2, 1)$

$\frac{1-4}{2+1} = \frac{-3}{3} = -1$

17. Discuss and compare the functions by analyzing the rates of change, intercepts, and where one function is greater or less than the other.

$f(x) = \frac{3}{2}x + 5$



AROC and intercepts for $f(x)$:

AROC $= \frac{3}{2}$ $x = -3$ $y = 5$

AROC and intercepts for $g(x)$:

$g(x) = 3^x + 1$ $3^0 + 1$ $3^1 + 1$ $(0,1)(1,4)$ $\frac{4-1}{1-0} = \frac{3}{1}$ AROC

$0 + 1$ $= 4$ $y = (0,2)$

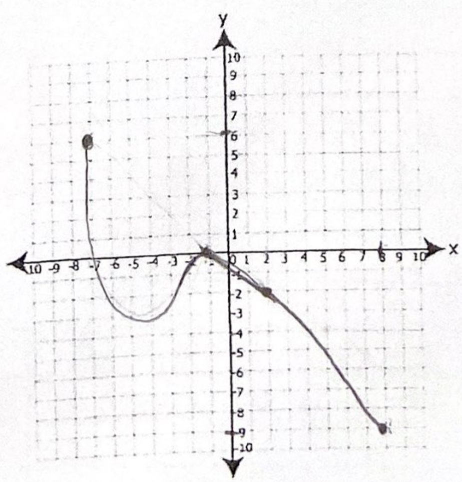
$= 1$

AROC changes as it increases; not ~~constant~~.

On what interval(s) is $f(x) > g(x)$? $[-2.75, 1.75]$

BONUS: Sketch a function with domain [-7, 8] and range [-9, ~~6~~1] that has AROC of $\frac{-2}{3}$ on the interval [-1,2]

[-9, 6]

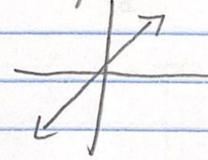


Diff b/t interval notation & inequality notation. 12-6-19

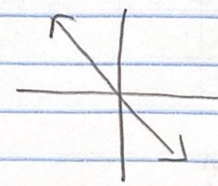
Int Not.	Ineq. Not.
[0,4]	$0 \le x \le 4$
[6, ∞]	$x \ge 6$
[-∞,5]	$x < 5$

End Behavior: the behavior of y as x gets very large or very small.

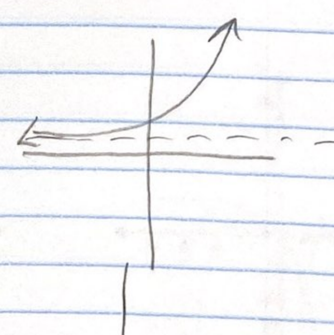
As $x \to \infty$, $y \to \underline{\infty}$
As $x \to -\infty$, $y \to \underline{-\infty}$



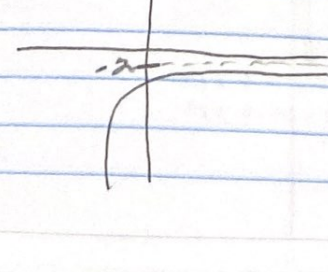
As $x \to \infty$, $y \to -\infty$
As $x \to -\infty$, $y \to \infty$



As $x \to \infty$, $y \to \infty$
As $x \to -\infty$, $y \to 1$



As $x \to \infty$, $y \to -2$
As $x \to -\infty$, $y \to -\infty$



[12-9-19]

- ID the initial value & ROC for linear & exponentials
- Build factors from context

* ALL functions have an initial value and a ROC.

Linear		Exponential	
ROC	Initial value	ROC	Initial value
$y = 3x + 2$ (adding the same # every time)	"starts with"	$y = 2^x$ (multiplying)	"starts with"
each every per	"begins with"	doubles...	"begins with"
repeated addition	"initial"	each every per	"initial"
	time zero	repeated multiplication	time zero
	y-int.		

- ROC tells whether it's linear or expo.
Repeated addition is linear.
Repeated multiplication is exponential.

* see handout

12-9-19

Coordinate Algebra Linear and Exponential Functions NAME_______________________________pd______

Linear functions:

$y = mx + b$ where m is the slope and b is the y intercept

$y = mx + b$ where m is what happens per, every, or each and b is what happens only one time

ROC

- A plumber charges $65 per hour and a one-time service call fee of $50. initial value
- $y = 65x + 50$

Linear functions make lines when the solutions are graphed.

Exponential functions:

initial amt. multiplier

$y = a{\cdot}(b)^x$ where y is the ending value, a is the starting value, b is the base, and x is time

as a decimal

$y = a{\cdot}(1+r)^x$ where y is the ending value, a is the starting value, r is % growth, and x is time

$y = a{\cdot}(1-r)^x$ where y is the ending value, a is the starting value, r is % decay, and x is time

The base is what the starting amount is doing – doubling means base=2, triple means base=3, half means the base is $\frac{1}{2}$, (1+r) means it's growing at a rate of r and (1-r) means it's decaying at a rate of r.

The exponent is always a fraction. The numerator is the total amount of time. The denominator is how often the base multiplies.

A population of rabbits starts with 2 rabbits and triples every week.

- $y = 2(3)^{\frac{x\ weeks}{1\ week}}$

A home's value is currently $274,000 and increases at a rate of 5.3% per year.

- $y = 274{,}000(1+.053)^{\frac{x\ years}{1\ year}}$

A population of rabbits starts with 2 rabbits and triples every 5 weeks.

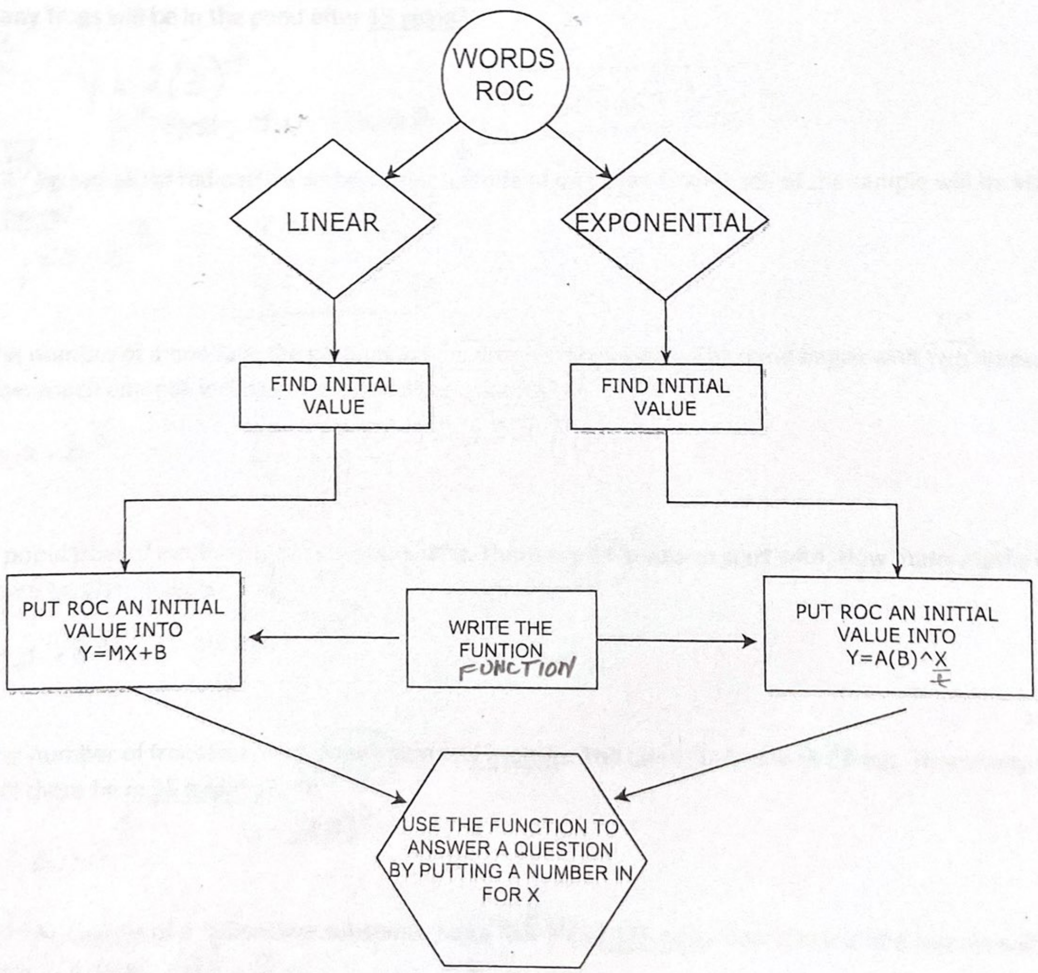
- $y = 2(3)^{\frac{x\ weeks}{5\ weeks}}$

A home's value is currently $274,000 and decreases by 2.5% every 6 months.

- $y = 274{,}000(1-.025)^{\frac{x\ months}{6\ months}}$

Exponential functions make curves when the solutions are graphed. Growth swings from the left side then up and decay comes down then swoops right getting closer to the x axis or asymptote.

12-10-19


WORDS
ROC
LINEAR
EXPONENTIAL
FIND INITIAL VALUE
FIND INITIAL VALUE
PUT ROC AN INITIAL VALUE INTO Y=MX+B
WRITE THE FUNTION
FUNCTION
PUT ROC AN INITIAL VALUE INTO Y=A(B)^X
t
USE THE FUNCTION TO ANSWER A QUESTION BY PUTTING A NUMBER IN FOR X

12-10-19

1

Coordinate Algebra Linear and Exponential Functions NAME__________________________pd______

For each problem: Identify initial value and ROC. Then write an equation. Give the y-intercept and it's meaning in context, and give one more point AND its meaning in context.

1. A population of moths doubles every month. There are 25 moths to begin with. How many moths will there be after one year?

2 Initial value

$y = a \cdot b^{\frac{x}{t}}$

$y = 25(2)^{\frac{x}{\text{month}}}$ must use the same unit of time, so use 12 months.

$y = 25(2)^{\frac{12}{1}}$

$\boxed{y = 102{,}000}$

2. The number of frogs in a pond triples every year. When the pond was filled, they put two frogs in. How many frogs will be in the pond after 15 years?

3 IV

$y = a \cdot b^{\frac{x}{t}}$ $y = 2(3)^{\frac{15}{1}}$

3^{15} first, then times 2

$\boxed{y = 28{,}697{,}814}$

3. A 47 kg sample of radioactive carbon has a half-life of one year. How much of the sample will be left after 2 years?

IV $\frac{1}{2}$

$y = a \cdot b^{\frac{x}{t}}$ $y = 47(\frac{1}{2})^{\frac{2}{1}}$

$\boxed{y = 11.75\text{kg}}$

4. The number of amoeba in the green pond quadruples every week. The pond began with two amoeba. How much amoeba will be in the pond after a month? $\frac{4}{1}$

4 IV

$y = a \cdot b^{\frac{x}{t}}$ $y = 2(4)^4$ $(2)(256)$

$\boxed{y = 512}$

5. A population of moths triples every 6 months. There are 23 moths to start with. How many moths will there be after 4 years? $\frac{48}{6} = 8$

3 IV

$y = a \cdot b^{\frac{x}{t}}$ $y = 23(3)^8$

$y =$

6. The number of frogs in a pond doubles every 7 months. The pond started with 2 frogs. How many frogs will there be in 35 months? $\frac{35}{7} = 5$

$y = a \cdot b^{\frac{x}{t}}$ $y = 2(2)^5$

7. A 75 kg sample of a radioactive substance has a half-life of 175 days. How much of the sample will be left after 525 days? $\frac{525}{175} = 3$

$\frac{1}{2}$

$y = a \cdot b^{\frac{x}{t}}$ $y = 75(\frac{1}{2})^3$

$75(.125)$

$y = 9.375\text{kg}$

8. The number of amoeba in the green pond triples every 84 hours. The pond began with two amoeba. How much amoeba will there be in the pond at 50 hours?

3

$\frac{50}{84}$ 1.165

$y = a \cdot b^{\frac{x}{t}}$ $y = 2(3)^{\frac{50}{84}}$

$y = 2(3)^{.59}$

$y = 2(1.93)$

$\boxed{y = 3.84}$

12-11-19

Coordinate Algebra Linear and Exponential Functions NAME_________________________pd_____

$y=a(b)^{\frac{x}{t}}$

Identify the initial value and ROC. The determine if linear or exponential. Then write equations and solve.

1. A plumber charges $75 per hour and a $50 service call fee.
   a) What is the charge for 4.25 hours?

$y=mx+b$

$y=75(4.25)+50$

$y=318.75+50$

$\boxed{y=\$368.75}$

2. Cats weigh 6 ounces at birth and gain 4 ounces per week.
   a) How long since the cat's birth if it weighs 13.9 ounces?

$13.9=4x+6$

$-6 \quad -6$

$\frac{7.9}{4}=\frac{4x}{4}$ $\boxed{x=1.975}$

3. The value of a home is currently $228,000 and increases at 4.7% per year.
   a) What is the value of the home after 3 years?

IV .047

$y=a\cdot b^{\frac{x}{t}}$

$y=228000(1+\frac{.047}{1})^{\frac{3}{1}}$

$y\ \$261,682.63$

4. Elizabeth has $758 in her ICarly piggy bank and she is saving $5 per week.
   a) How much does she have in her piggy bank after 52 weeks?

$y=mx+b$

$y=5(52)+758$

$y=260+758$

$\boxed{y=\$1,018}$

5. I deposited $5700 into an account that pays 4.5% compounded quarterly.
   a) How much is in the account after one year? (Think about how many "quarters" this is)

IV

$y=a(1+\frac{r}{4})^{\frac{x}{t}}$

$y=5700(1+\frac{.045}{4})^{\frac{x}{3}}$

$y=5700(1+\frac{.045}{4})^{\frac{12}{3}}$

$y=5700(1+.01125)^4$

$y=5700(1.01125)^4$

$y=\$5960.86$

5960.86

6. Lali owes $375 and repays it at $20 per week.
   a) How long has he been repaying money if he still owes $75?

$75=-20x+375$

$-375 \quad -375$

$-300=-20x$

$\boxed{15wk=x}$

7. Your great grandpa left you $83,000. You deposit into an account that pays 3.9% compounded quarterly.
   a) How much money is in the account (assuming you didn't use it to buy something) after 2 years?

.039 4

$a(1+\frac{r}{4})^{\frac{x}{t}}$

$y=83,000(1+\frac{.039}{4})^{\frac{x}{3}}$

$y=83,000(1+\frac{.039}{4})^{\frac{24}{3}}$ $24 \div 8$

$y=83,000(1+.00975)^8$

$\boxed{y=\$89,699.29}$

8. The US national debt is currently $17 trillion and it increases by 12% per year.

.12

a) Yikes... How much will the debt be in 2025?

$y = 17(1+\frac{.12}{1})^{\frac{6}{1}}$

$\boxed{y = \$33.55 \text{ trillion}}$

9. Jake has 23 Skylanders and buys 3 more every year. $y = mx + b$

a) How many does he have after 6.7 years?

$y = 3(6.7) + 23$

$y = 20.1 + 23$

$y = 40.2$

$\boxed{40 \text{ skylanders}}$

10. The lunchroom starts the month with 25,000 packs of raisins. 237 packs of raisins are sold per day.

a) If 15,000 packs of raisins are left, how many days have passed?

$15{,}000 = 25{,}000 - 237x$

$-10{,}000 = -237x$

$\frac{-10{,}000}{-237} \quad \frac{-237x}{-237}$

42.19

$\boxed{42 \text{ days}}$

11. The number of species on earth right now is 997,000 and decreases by 5.9% per year.

.059

a) How many species will there be in 30 years?

$y = 997{,}000(1-.059)^{30}$

$\boxed{y = 160{,}836 \text{ species}}$

12. The number of cases of Ebola is growing at an 17% rate every 10 days – we started with one case.

a) How many cases of Ebola will there be in 160 days?

$y = 1(1+.17)^{\frac{160}{10} = 16}$

$y = 12.33$

$\boxed{12 \text{ cases}}$

13. You invest $5000 in an account that pays 8.3% compounded monthly.

.083

a) How much money will be in the account after 3 years?

$y = 5000(1+.083)^{\frac{36}{1}}$

$\boxed{y = \$88{,}225.56}$

14. A bathtub holds 38 gallons of water. The water drains at 3.5 gallons per minute.

a) If 38 gallons remain, how many minutes have passed?

0 mins.

15. Your uncle left you $7500. You deposit it into an account that pays 4.3% compounded semiannually.

.043

a) How much money will be in the account after 2 years?

$y = 7500(1+\frac{.043}{2})^{\frac{24}{6} = 4}$

$y = \$8{,}166.10$

12-10-19

Words
ROC

Linear
initial value
insert ROC & into $y = mx + b$
ROC
initial value

Exponential
initial value
insert ROC & initial value
$y = a \cdot b^{\frac{x}{t}}$ → time (how often it multiplies)
initial
ROC

12-11-19

ROC

linear
IV
function
?

expo.
IV
function
?

Compounding Periods
# of compounds per year
monthly = 12 $\left(\frac{r}{12}\right)$
quarterly = 4 $\left(\frac{r}{4}\right)$
weekly = 52
semi-annually = 2 $\left(\frac{r}{2}\right)$

$y = a\left(1 + \frac{r}{12}\right)^{\frac{x}{t}}$ → monthy