

Algebra 1 Semester 2 Study Guide

I. Exponential Functions Review

a) Sketch a graph that shows exponential:

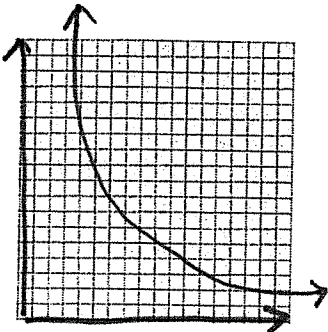
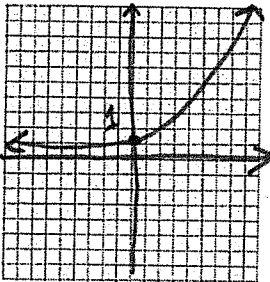
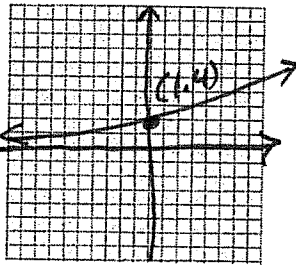
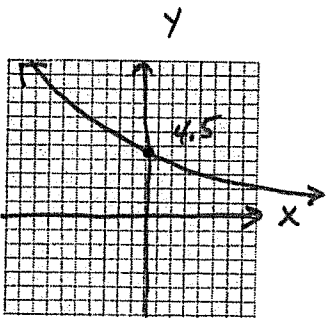
Growth

Decay

b) What is the growth or decay factor

c) the initial value

d) the domain and range

	1) $y = 35(0.57)^x$	2) $y = 1.3^x$	3) $y = 1.4(1.03)^x$	4) $y = 4.5(0.95)^x$
				
a-	Decay	Growth	Growth	decay
b-	0.57	1.3	1.03	0.95
c-	35	1	1.4	4.5
d-	$(-\infty, \infty)$ $(0, +\infty)$	$(-\infty, \infty)$ $(0, \infty)$	$(-\infty, \infty)$ $(0, \infty)$	$(-\infty, \infty)$ $(0, \infty)$

5. The population in 2012, of a small Upper Peninsula town was approximately 2,500. The following equation can be used to model the change, $g(t)$, over time, t , in years:
 $g(t) = 2500(1.15)^t$

a) What is the percent of growth or decay per year in this town?

15%

b) Is the population increasing or decreasing? Explain how you know.

increasing because our $(b) > 1$

c) Where will the graph of the function cross the vertical axis? Explain how you know.

yes, because it is my starting population which is \$2500

d) What does the vertical intercept indicate in the context of the problem?

starting population

e) How would an increase in the percentage rate of growth affect the graph of the function?

f) What will be the predicted population in 2020? $2012 - 2020 = 8 \text{ years}$
 $t = 8$ $g(8) = 2500(1.15)^8 = 7647.56 \text{ people}$

6. A dust bunny gathers dust at a rate of 11% per week. The dust bunny originally weighs 0.7 oz.

a) Write a function that represents the weight of the dust bunny at a given time. Use x for weeks and y for the weight of the dust bunny.

$$y = 0.7(1.11)^x$$

b) Find the weight of the dust bunny after 7 weeks.

$$x = 7 \quad y = 0.7(1.11)^7 = 1.45 \text{ oz}$$

7. Which of the following functions represents an exponential growth of 3%

a- $y = 35(0.57)^x$

~~b- $y = 1(3)^x$~~

~~c- $y = 1.4(1.03)^x$~~

d- $y = 4.5(0.95)^x$

C

8. Which of the following functions represents an exponential decay of 5%

e- $y = 35(0.57)^x$

f- $y = 1.3^x$

g- $y = 1.4(1.03)^x$

h- $y = 4.5(0.95)^x$

9. Ahmed wanted to predict the population of bacteria. When experimenting, he started with 50 cells of bacteria and he noticed that it grew by 10% every hour. He predicted that the equation for the function will be $F(x) = 50(0.1)^x$ after x hours?

$F(x) = 50(0.1)^x$
↓
1.1

What is the error that Ahmed made in the equation?

$b = 1 + r = 1 + 0.1 = 1.1$

10. Sara buys a computer for \$5000. The value depreciates 10% per year. The value of Sara's car, $C(t)$, can be represented by the following functions?

a. $C(t) = 5000 + 0.10t$

b. $C(t) = 5000(0.10)^t$

c. $C(t) = 5000(0.90)^t$

d. $C(t) = 0.90t + 5000$

III. SLOT

Find the sum, difference or product of each for 1 - 12.

$$1. (4x^2 - 5x) - 2x(2x^2 - 3x + 3)$$

$$-4x^3 + 10x^2 - 11x$$

$$3. (6 - 3x^2) + (x^3 - x + 5)$$

$$x^3 - 3x^2 - x + 11$$

$$5. (2a + 3b)^2 = (2a + 3b)(2a + 3b)$$

$$4a^2 + 12ab + 9b^2$$

$$7. (-4x^2 + 5x - 8) + (-x^2 + 3x + 6)$$

$$-5x^2 + 8x - 2$$

$$9. (2x^3 + 4x^2 + 1)(x - 4)$$

$$2x^4 - 4x^3 - 8x^2 + x - 4$$

$$2. (3p - 7)(3p + 4)$$

$$9p^2 - 9p - 28$$

$$4. -2n^3(n^2 - 3n + 4)$$

$$-2n^5 + 6n^4 - 8n^3$$

$$6. (4x + 3)(2x + 1)$$

$$8x^2 + 7x + 3$$

$$8. (2x^2 - 3x - 3) - (-6x^2 + 3x + 8)$$

$$-4x^2 - 6x - 11$$

10. In accounting, a company's gross profit rate measures how well the company controls cost of goods

sold to maximize gross profit. The gross profit rate, P , is calculated using the

$$\text{formula } P = \frac{S - C}{S},$$

$$C = S - PS$$

where S is the net sales and C is the cost of goods sold. Rearrange the formula to solve for the

cost of goods sold (C).

11. The surface area, S , of a right circular cylinder is calculated using the formula $S = 2\pi r^2 + 2\pi r h$,

where r is the radius of the cylinder and h is the height of the cylinder.

Rearrange the formula to

solve for height (h).

$$S = 2\pi r^2 + 2\pi r h$$

$$\frac{S - 2\pi r^2 - 2\pi r^2}{2\pi r} = \frac{2\pi r h}{2\pi r}$$

$$h = \frac{S}{2\pi r} - r$$

12. If F denotes a temperature in degrees Fahrenheit and C is the same temperature measured in

degrees Celsius, then F and C are related by the equation $F = \frac{9}{5}C + 32$.

Rewrite this equation to

solve for C in terms of F .

$$C = \frac{5}{9}(F - 32)$$