

Matching Exponential Graphs and Equations:

Name: _____

Directions: Match each equation first with a description of the transformations of the equation (number match) and then with its graph (letter match).

$y = 3^x$

Number Match: _____

Letter Match: _____

~~$y = 3^{-x}$~~

Number Match: _____

Letter Match: _____

$y = 3^x - 4$

Number Match: _____

Letter Match: _____

$y = -3^{x-2}$

Number Match: _____

Letter Match: _____

~~$y = 3^{-x}$~~

Number Match: _____

Letter Match: _____

$y = 3^x + 1$

Number Match: _____

Letter Match: _____

$y = -3^x$

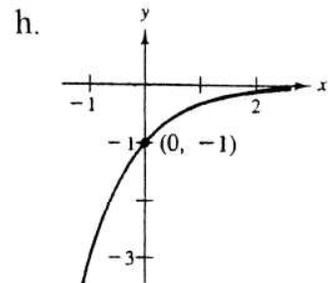
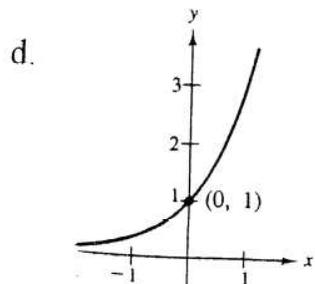
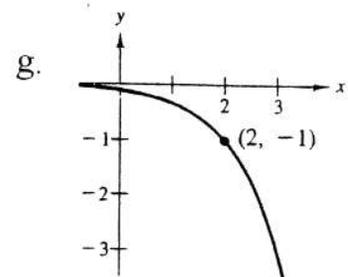
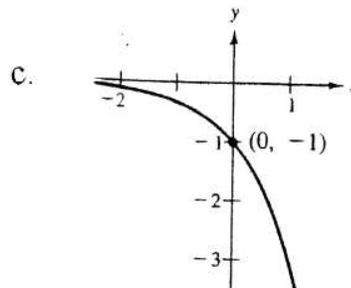
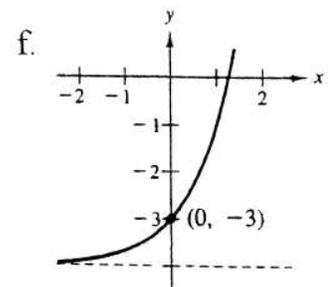
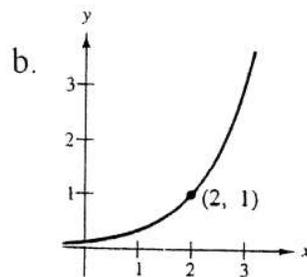
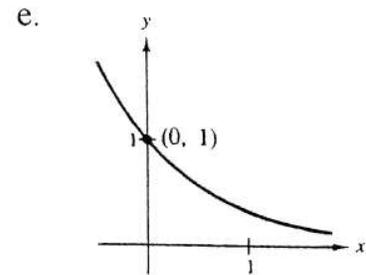
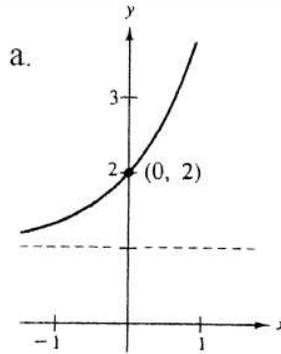
Number Match: _____

Letter Match: _____

$y = 3^{x-2}$

Number Match: _____

Letter Match: _____



1. $y = 3^x$ reflected over the x axis and shifted right two
2. $y = 3^x$ with no transformations
3. ~~$y = 3^x$ reflected over the y axis~~
4. $y = 3^x$ shifted up 1
5. $y = 3^x$ shifted right 2
6. ~~$y = 3^x$ reflected over the x and y axis~~
7. $y = 3^x$ shifted down 4
8. $y = 3^x$ reflected over the x axis

Name _____

Date _____ Hour _____

Worksheet 3 Graphing exponential functions

Identify each transformation from the parent function of $f(x)=B^x$. Tell if the function is a decay or growth function.

1. $g(x) = 3^{x-2}$ _____

2. $g(x) = \frac{1}{2}^x + 3$ _____

3. $g(x) = -4^x - 6$ _____

4. $g(x) = -\frac{2}{3}^{x-5} + 4$ _____

5. $g(x) = 2^{x-7} + 5$ _____

6. $g(x) = 3(2^{x+1}) + 2$ _____

Write the function for each graph described below.

7. the graph of $f(x) = 2^x$, reflected across the x axis. _____

8. The graph of $f(x) = \frac{1}{3}^x$, translated up 5 units. _____

9. The graph of $f(x) = 3^x$, left 2 units, and down 3. _____

10. The graph of $f(x) = \frac{1}{2}^x$, translated down 2 units _____

11. The graph of $f(x) = 4^x$, stretched horizontally by a factor of 3 _____

12. The graph of $f(x) = 2^x$, up 4 units, right 3 _____

Analyzing Graphs of Exponential Functions

Analyze each graph and then answer the questions.

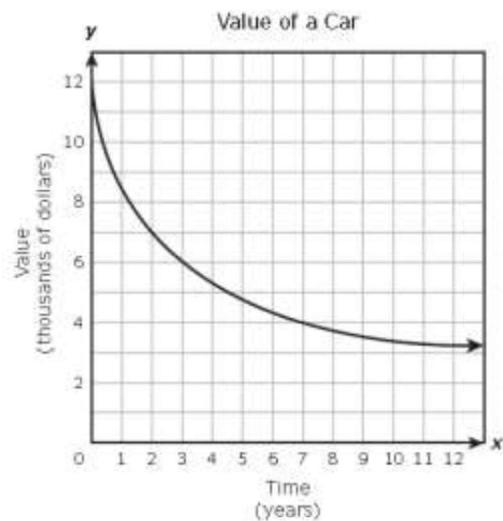
① The graph shows the change in the value of a car over several years.

a) Is the value of the car increasing or decreasing?

b) Is this graph linear, quadratic or exponential?
How can you tell?

c) From year 0 to year 3, how much did the value of the car change?

How does this number compare to the initial value?



② The graph shows an office worker's annual salary.

a) Is this worker's annual salary increasing or decreasing?

b) How much is this office worker's initial salary?

Write an exponential equation using this value.

$$y = \underline{\hspace{2cm}} (\underline{\hspace{1cm}})^x$$



③ The graph shows the number of coffee stores after 1992.

a) Is this graph linear, quadratic or exponential?
How can you tell?

b) How many stores were open in 1992?

c) Which of the following equations might fit this data?

$$y = 400(1.25)^x \quad y = 400(0.75)^x \quad y = 1.25(400)^x$$

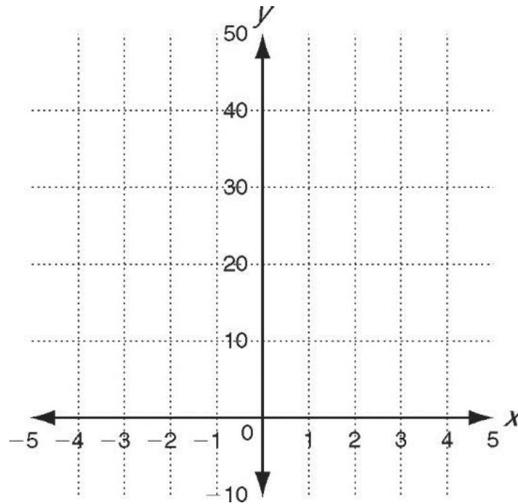


Sec. 4.1-4.2 Classwork Algebra II

Sec. 4.1: Exponential Functions, Growth and Decay

Tell whether the function shows growth or decay. Then graph. **REMEMBER TO PICK YOUR 5 POINTS (-2, -1, 0, 1, 2) AND MAKE AN X/Y CHART!!**

1. $g(x) = 6(0.35)^x$



Solve.

2. The St. Louis city population, which is currently 318,416, has been dropping 3% a year. Write an exponential function. What will population be in 2030? Round to nearest thousand people.

3. Martese decides he wants to open up a savings account after graduating high school in 2020. If he invests \$1800 with a 4.3% interest rate, how much money will he have in 2024 when he graduates college?

Sec. 4.2: Inverses of Relations and Functions.

Finding Inverses: Find an equation for the inverse for each of the following relations.

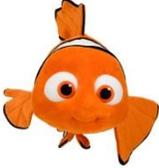
4. $f(x) = x + 2$

5. $f(x) = -5x - 7$

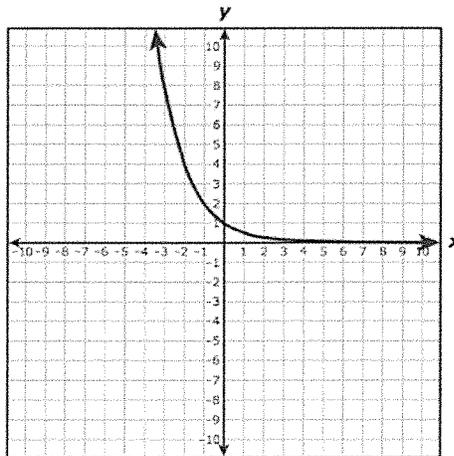
6. $f(x) = 12x - 3$

7. $f(x) = -8x + 16$

Question	Exponential Growth or Decay?	Write a function that represents this situation	Answer:
<p>1. You buy a house for \$130,000. It appreciates 6% per year. How much is it worth in 10 years?</p> 		<p>Initial Amount =</p> <hr/> <p>Growth/Decay Rate:</p> <p>Percent = _____ Decimal = _____</p> <p>Function that represents this situation:</p>	
<p>2. Mr. MD is losing 20% of his hair each year 😊 If he currently has 1,546 hairs on his head, about how many hairs will he have left after 10 years?</p> 		<p>Initial Amount =</p> <hr/> <p>Growth/Decay Rate:</p> <p>Percent = _____ Decimal = _____</p> <p>Function that represents this situation:</p>	
<p>3. If you invest \$40 in an account for 10 years at a 3% interest rate how much money will you have?</p>		<p>Initial Amount =</p> <hr/> <p>Growth/Decay Rate:</p> <p>Percent = _____ Decimal = _____</p> <p>Function that represents this situation:</p>	
<p>4. A population of 100 frogs increases at an annual rate of 22%. How many frogs will there be in 5 years?</p>		<p>Initial Amount =</p> <hr/> <p>Growth/Decay Rate:</p> <p>Percent = _____ Decimal = _____</p> <p>Function that represents this situation:</p>	

<p>5. A species of extremely rare, deep water fish are slowly becoming extinct. If there are a total 821 of this type of fish and there are 15% fewer fish each month, how many will there be in half a year?</p> 		<p>Initial Amount =</p>	
<p>6. The population of Austin is growing at a rate of 5% per year. In 2010, the population was 500,000. What would be the predicted current population?</p>		<p>Growth/Decay Rate:</p>	
<p>7. Use the equation from the previous question and predict in what year Austin's population will first reach 1,000,000.</p>		<p>Percent = Decimal =</p>	
<p>8. A mouse population is 25,000 and is decreasing in size at a rate of 20% per year. What is the mouse population after 3 years?</p>		<p>Function that represents this situation:</p>	
<p>9. A super-deadly strain of bacteria is causing the zombie population to double every 2 days. Currently, there are 25 zombies. After how many days will there be 25,600 zombies?</p> <p>(Careful with this one!!!)</p>			
<p>10. Use the function from the previous question. If the current population of our planet is 5,000,000,000 people, after how many days will there be no humans left?</p>			

- 21 The graph of an exponential function is shown on the grid.



Based on the graph, which statement about the function is true?

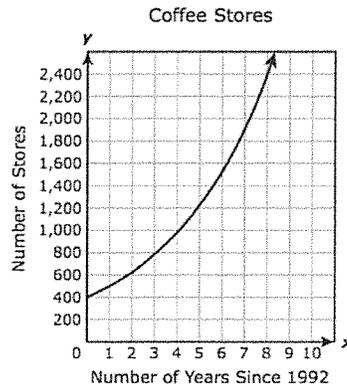
- A The range is the set of all real numbers less than 0.
 - B The domain is the set of all real numbers greater than -4 .
 - C The range is the set of all real numbers greater than 0.
 - D The domain is the set of all real numbers less than -4 .
- 40 The table contains some points on the graph of an exponential function.

x	y
0	0.0625
1	0.25
2	1
3	4

Based on the table, which function represents the same relationship?

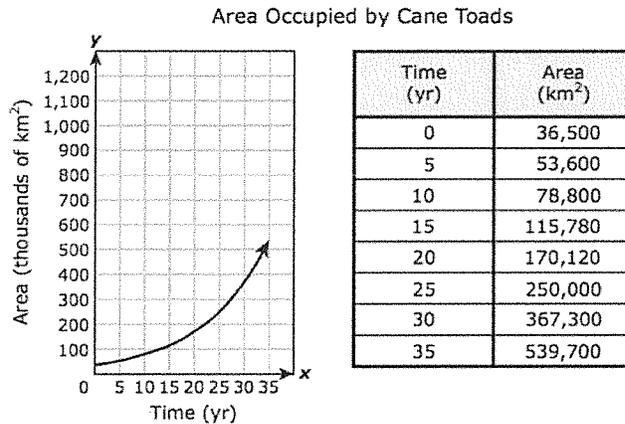
- F $q(x) = (0.25)^x$
- G $q(x) = 256(0.25)^x$
- H $q(x) = 0.0625(4)^x$
- J $q(x) = 0.5(4)^x$

- 50 The number of stores opened by a coffee company can be modeled by the exponential function graphed on the grid, where x is the number of years since 1992.



Based on the graph, which statement does **not** appear to be true?

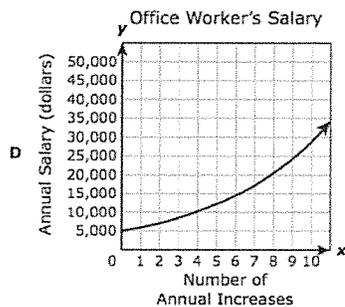
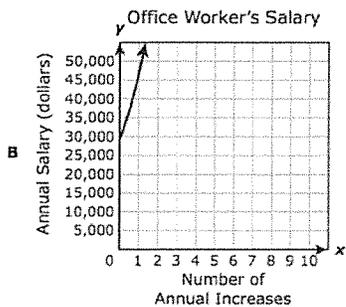
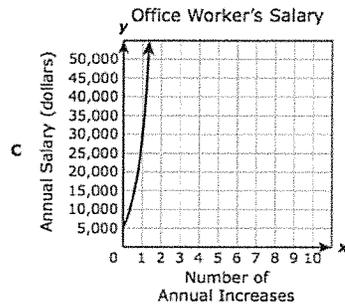
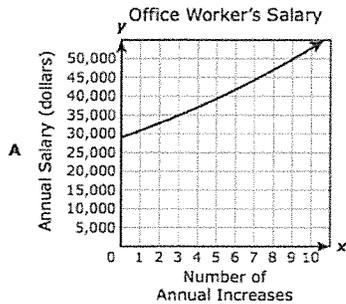
- F The coffee company had opened 400 stores by the end of 1992.
 - G The coffee company opened 100 stores in one year.
 - H Every year the number of stores the coffee company opened increased by 25%.
 - J Since 1992 the coffee company has opened 250 stores each year.
- 17 The exponential function modeled below represents the number of square kilometers of land occupied by cane toads x years after this animal was first introduced into Australia.



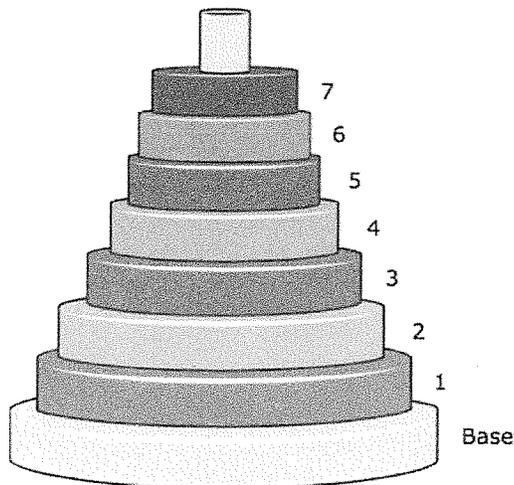
Based on the data, which measurement is closest to the number of square kilometers of land that will be occupied by cane toads 40 years after this animal was first introduced into Australia?

- A 550,000 km²
- B 1,250,000 km²
- C 600,000 km²
- D 800,000 km²

- 9 The starting annual salary for an office worker at a company is \$29,000. If the company awards an annual increase of 6.2%, which graph models this situation after the office worker receives x annual increases?



- 28 A toy is made up of cylindrical rings stacked on a base, as shown in the diagram. The diameter of Ring 1 is 87% of the diameter of the base. For Ring 2 through Ring 7, the diameter of each ring is 87% of the diameter of the ring directly below it.



The diameter of the base is 5 inches. Which function can be used to find the diameter in inches of Ring r , where $1 \leq r \leq 7$?

- F** $d(r) = 5(0.87)^r$
G $d(r) = 0.87(r - 5)$
H $d(r) = 0.87(5)^r$
J $d(r) = 5(r - 0.87)$