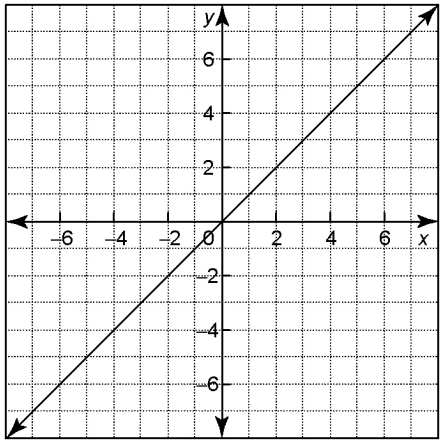
Name: _____ Date: _____

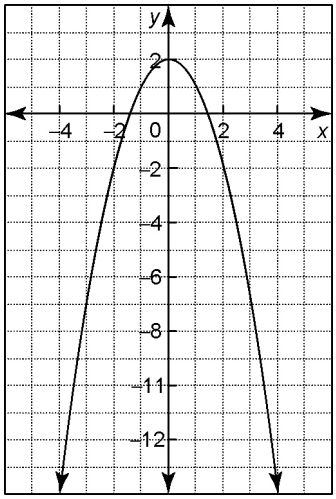
Section 7.4 Exponential Relations

1. Identify the type of growth (linear, quadratic or exponential) illustrated by each graph. Justify your answers.

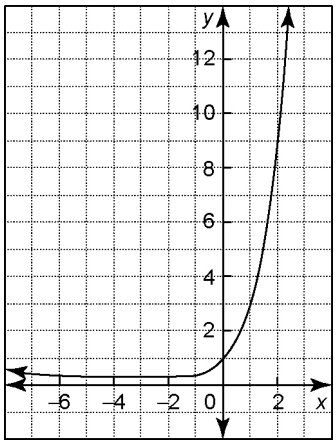
a)



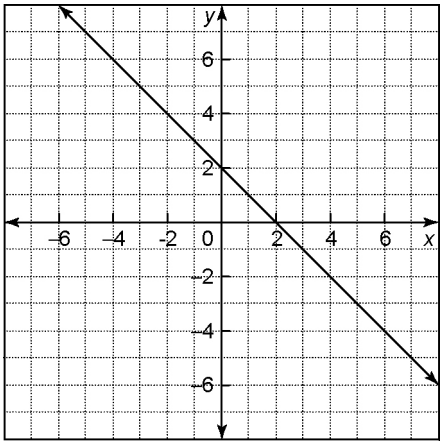
b)



c)



d)



2. How do the graphs of $y = 5^x$ and $y = \left(\frac{1}{5}\right)^x$ compare? Use a graphing calculator to check your answer.

3. Sketch each exponential relation. Use a graphing calculator to check.

a) $y = \left(\frac{1}{2}\right)^x$ **b)** $y = 4\left(\frac{1}{2}\right)^x$

c) $y = -3\left(\frac{1}{2}\right)^x$ **d)** $y = 0.1\left(\frac{1}{2}\right)^x$

4. Make a table of values for each relation. Graph each pair of relations on the same set of axes. Use a graphing calculator to check.

a) $y = 2^x$ $y = 3(2^x)$

b) $y = (0.3)^x$ $y = \frac{1}{2}(0.3)^x$

c) $y = 4^x$ $y = 4^{\left(\frac{x}{2}\right)}$

d) $y = \left(\frac{1}{3}\right)^x$ $y = \left(\frac{1}{3}\right)^{3x}$

e) $y = 3^x$ $y = -2(3^{2x})$

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5. Hardip invested $8000 this year. The value of the investment can be modelled by the relation $A = 8000(1.045)^t$, where A represents the value of the investment in dollars and t represents the time in years.

a) Sketch a graph of the relation.

b) What is the A-intercept? What does this value represent?

c) What will this investment be worth in 5 years? 10 years? 15 years?

6. Which relation (linear, quadratic or exponential) would best model each situation? Explain.

a) the amount of radioactive material becomes half of the previous amount every 214 days

b) the path of a soccer ball after it is kicked

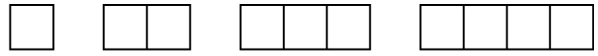
c) Ernie gets a $1/h raise every year from his employer

d) Simone gets a 5% increase in her salary every year from her employee

e) the path of a rock thrown from a bridge

f) the value of a rare hockey card increases by 9% each year.

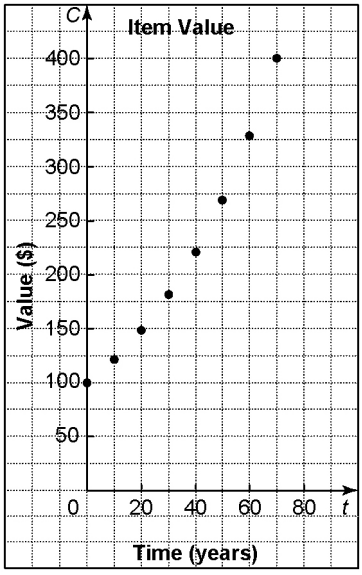
7. A farmer increases the number of types of animals she raises. With each new type of animal, a new area of field must be fenced off, creating a pen with side length 50 ft.



a) Describe the pattern related to the number of 50-ft sections of fencing needed as the types of animals increase.

b) How many 50-ft sections of fencing are needed if the farmer decides to raise six types of animals?

8. The value of an item increases by 2% each year. The graph shows the value of this item over time.



a) Suzanne says that the relation could be exponential, but it could also be quadratic. Do you agree? Explain.

b) Refer to the graph. After how many years was the value of the item $200?

c) The item's value can be modelled by the relation $C = 100(1.02)^t$, where C represents the value of the item in dollars and t represents the time in years. Use the relation. After how many years was the value of the item $200?

d) Determine how long it took for the value of the item to reach $300. Use both the graph and the relation. How do the answers compare?