Name_____ Date_____ Hour___

Algebra 2 (basic) – 6.2 (trb, reteach, vs16x) Exponential Functions

6.2 Goals: Classify an exponential function as representing growth or decay; calculate the growth of an investment under give conditions; apply

◆Skill A Identifying a function as linear, quadratic, or exponential

Recall An exponential function contains a variable in an exponent.

◆ **Example**

Classify each function as linear, quadratic, or exponential.

a. $f(x) = 1.5x^2 - 2.5$ **b.** $g(x) = 7x - 5$ **c.** $h(x) = 5(1.3)^x$

◆ **Solution**

a. $f(x)$ is a quadratic function because the variable x is a base and its highest exponent is 2.

b. $g(x)$ is a linear function because the variable x is a base and its highest exponent is 1.

c. $h(x)$ is an exponential function because the variable x is used as an exponent.

Identify each function as linear, quadratic, or exponential.

1. $f(x) = 0.7x - 12$ _____

2. $f(x) = 25 - 1.8x^2$ _____

3. $f(x) = 7(0.5)^x$ _____

4. $f(x) = 3x$ _____

5. $f(x) = 7^{0.5x}$ _____

6. $f(x) = (8 - x)^2$ _____

◆Skill B Classifying an exponential function as exponential growth or exponential decay

Recall The function $f(x) = b^x$ represents exponential growth if $b > 1$ and exponential decay if $0 < b < 1$.

◆ **Example**

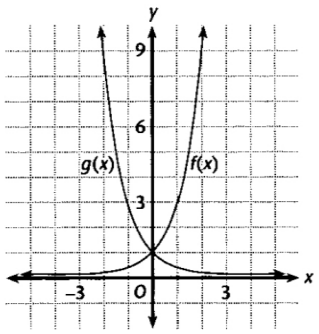
Identify each function as exponential growth or decay and then graph each function.

a. $f(x) = 3^x$ **b.** $g(x) = \left(\frac{1}{3}\right)^x$

◆ **Solution**

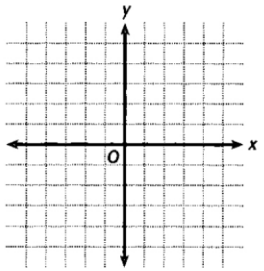
a. $f(x) = 3^x$ represents exponential growth because the base 3 is greater than 1. The graph is shown at right.

b. $g(x) = \left(\frac{1}{3}\right)^x$ represents exponential decay because the base $\frac{1}{3}$ is between 0 and 1. The graph is shown at right.



Identify each function as exponential growth or exponential decay. Then graph each function.

7. $f(x) = \left(\frac{2}{3}\right)^x$



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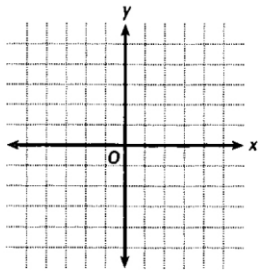
8. $f(x) = \left(\frac{3}{2}\right)^x$



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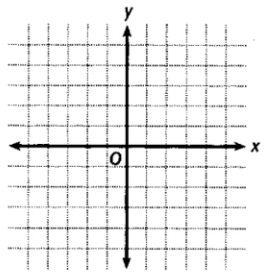
9. $f(x) = 3\left(\frac{1}{2}\right)^x$



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◆Skill C Calculating compound interest

Recall The formula for compound interest is $A(t) = P\left(1 + \frac{r}{n}\right)^{nt}$, where P is the principal, r is the annual interest rate, n is the number of times interest is compounded each year, and t is the time in years.

◆ **Example**

Find the amount of a \$500 investment after 8 years at 6% interest compounded

a. annually. **b.** quarterly. **c.** monthly.

◆ **Solution**

a. $A(8) = 500\left(1 + \frac{0.06}{1}\right)^{1 \cdot 8}$ *Annually means once a year ($n = 1$).*

≈ 796.92 or \$796.92

b. $A(8) = 500\left(1 + \frac{0.06}{4}\right)^{4 \cdot 8}$ *Quarterly means 4 times a year ($n = 4$).*

≈ 805.16 or \$805.16

c. $A(8) = 500\left(1 + \frac{0.06}{12}\right)^{12 \cdot 8}$ *($n = 12$)*

≈ 807.07 or \$807.07

Find the final value of each investment.

10. \$1000 at 4.5% compounded annually for 5 years _____

11. \$800 at 6.2% compounded monthly for 10 years _____

12. \$2300 at 8% compounded daily for 7 years _____

13. \$10,000 at 7.7% compounded monthly for 3 years _____

Algebra 2 (basic) – 6.2 (trb, reteach, vs16x) Exponential Functions

SOLUTIONS

6.2 Goals: Classify an exponential function as representing growth or decay; calculate the growth of an investment under give conditions; apply

1. linear

2. quadratic

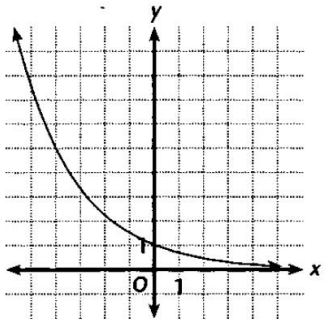
3. exponential

4. linear

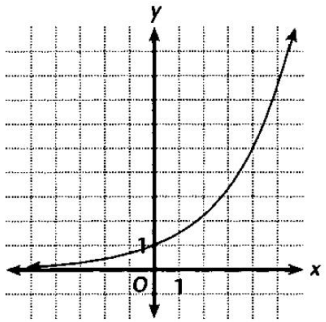
5. exponential

6. quadratic

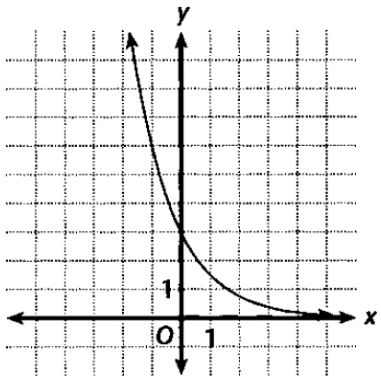
7. exponential decay



8. exponential growth



9. exponential decay



10. $1246.18 **11.** $1484.77

12. $4026.30 **13.** $12,589.30