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Equation	Sketch	Equation	Sketch
7) $y = \frac{1}{2}(4)^{x+3} - 1$ D: $\{x   x \in \mathbb{R}\}$ R: $\{y   y > -1\}$ Asymptote: $y = -1$ End Behavior: $x \rightarrow \infty, y \rightarrow \infty$ $x \rightarrow -\infty, y \rightarrow -1$	<p>Parent: <math>y = 4^x</math>            Shift from parent: vert. st. <math>\frac{1}{2}</math>            left 3            down 1</p>	10) $y = 2\left(\frac{1}{2}\right)^{-x+4} - 4$ D: $\{x   x \in \mathbb{R}\}$ R: $\{y   y > -4\}$ Asymptote: $y = -4$ End Behavior: $x \rightarrow \infty, y \rightarrow \infty$ $x \rightarrow -\infty, y \rightarrow -4$	<p>Parent: <del><math>y = \frac{1}{2}x</math></del> or <math>y = 2^x</math>            Shift from parent: v.s. 2  <del>right 4</del>            down 4</p>
8) $y = 3\left(\frac{1}{2}\right)^x - 6$ D: $\{x   x \in \mathbb{R}\}$ R: $\{y   y > -6\}$ Asymptote: $y = -6$ End Behavior: $x \rightarrow \infty, y \rightarrow -6$ $x \rightarrow -\infty, y \rightarrow \infty$	<p>Parent: <math>y = \frac{1}{2}x</math>            Shift from parent: vert. st. 3            down 6</p>	11) $y = 2^{-2x-6} + 1$ $= 2^{-(2(x+3))} + 1$ D: $\{x   x \in \mathbb{R}\}$ R: $\{y   y > 1\}$ Asymptote: $y = 1$ End Behavior: $x \rightarrow \infty, y \rightarrow 1$ $x \rightarrow -\infty, y \rightarrow \infty$	<p>Parent: <math>y = 2^x</math>            Shift from parent: roya            horiz. comp. <math>\frac{1}{2}</math>            left 3            vpl</p>
9) $y = \frac{1}{4}(2)^{x+3} - 4$ D: $\{x   x \in \mathbb{R}\}$ R: $\{y   y > -4\}$ Asymptote: $y = -4$ End Behavior: $x \rightarrow \infty, y \rightarrow \infty$ $x \rightarrow -\infty, y \rightarrow -4$	<p>Parent: <math>y = 2^x</math>            Shift from parent: vert. st. <math>\frac{1}{4}</math>            left 3            down 4</p>	12) $y = \frac{1}{3}(3)^{x+5} - 5$ D: $\{x   x \in \mathbb{R}\}$ R: $\{y   y > -5\}$ Asymptote: $y = -5$ End Behavior: $x \rightarrow \infty, y \rightarrow \infty$ $x \rightarrow -\infty, y \rightarrow -5$	<p>Parent: <math>y = 3^x</math>            Shift from parent: vert. comp. <math>\frac{1}{3}</math>            left 5            down 5</p>

# 10-6 Skills Practice

## Growth and Decay

**POPULATION** For Exercises 1 and 2, use the following information.

The population of New York City increased from 7,322,564 in 1990 to 8,008,278 in 2000. The annual rate of population increase for the period was about 0.9%. Source: www.nyc.gov

1. Write an equation for the population  $t$  years after 1990.

$$A = 7,322,564 e^{0.009t}$$

2. Use the equation to predict the population of New York City in 2010.

$$A = 8,766,701$$

**SAVINGS** For Exercises 3 and 4, use the following information.

The Fresh and Green Company has a savings plan for its employees. If an employee makes an initial contribution of \$1000, the company pays 8% interest compounded quarterly.

3. If an employee participating in the plan withdraws the balance of the account after 5 years, how much will be in the account?

$$A = \$1485.95$$

4. If an employee participating in the plan withdraws the balance of the account after 35 years, how much will be in the account?

$$A = \$15,996.47$$

5. **HOUSING** Mr. and Mrs. Boyce bought a house for \$96,000 in 1995. The real estate broker indicated that houses in their area are appreciating at an average annual rate of 4%. If the appreciation remains steady at this rate, what will be the value of the Boyce's home in 2005?

$$A = \$142,103.45$$

**MANUFACTURING** For Exercises 6 and 7, use the following information.

Zeller Industries bought a piece of weaving equipment for \$60,000. It is expected to depreciate at an average rate of 10% per year.

6. Write an equation for the value of the piece of equipment after  $t$  years.

$$A = 60000(0.90)^t$$

7. Find the value of the piece of equipment after 6 years.

$$A = \$31,886.46$$

8. **FINANCES** Kyle saved \$500 from a summer job. He plans to spend 10% of his savings each week on various forms of entertainment. At this rate, how much will Kyle have left after 15 weeks?

$$A = \$102.95$$

9. **TRANSPORTATION** Tiffany's mother bought a car for \$9000 five years ago. She wants to sell it to Tiffany based on a 15% annual rate of depreciation. At this rate, how much will Tiffany pay for the car?

$$A = \$3993.35$$