7 Chapter Self-Test

1. Evaluate without using a calculator.

a) 5^{-3} **c)** $8^{\frac{1}{3}}$ **e)** -7^0

b) $\left(\frac{3}{4}\right)^{-2}$ **d)** $16^{-0.75}$ **f)** $100^{\frac{-3}{2}}$

2. Write as a single power. Express answers with a positive exponent.

a) $(6)^{-\frac{1}{3}} \times (6)^{\frac{5}{6}}$ **c)** $\frac{10}{10^{-4}}$ **e)** $a^7(a^6)^{-2}$

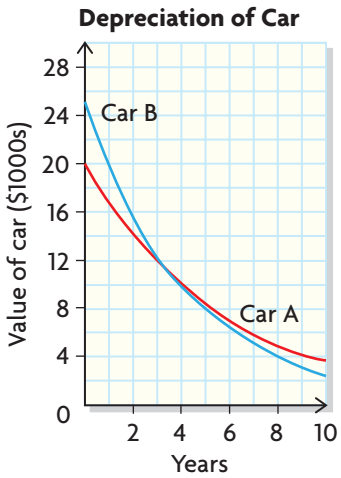
b) $4\left(\frac{1}{4}\right)^{-4}$ **d)** $\frac{7^8}{(7^2)^3}$ **f)** $\frac{b^3(b^{-2})}{b^4}$

3. Write $\sqrt[6]{4^3}$ in exponent form, then evaluate.

4. Sketch the graph of each function. If applicable, label the x- and y-intercepts and asymptotes.

a) $y = 2^x$ **b)** $y = 0.5^x$

5. The values of two different automobiles over time are shown in the graph.



a) Compare the initial value of each car with its value through the first 6 years of ownership.

b) Which car has the higher depreciation rate? Explain your reasoning.

6. An archaeologist discovers an ancient settlement. To determine the age of the settlement, she measures the radioactivity of a fragment of bone recovered at the site. Carbon-14 has a half-life of 5730 years. The algebraic model for the radioactivity of carbon-14 is

$$A(t) = 100\left(\frac{1}{2}\right)^{\frac{t}{5730}}$$

Determine the radioactivity of the bone, to the nearest percent, if it is 12 000 years old.

7. The population of a small town has increased at a rate of 1.5% per year since 1980. The town had a population of 1600 that year.

a) Write the equation that models the growth in population of the town. Describe each part of your equation.

b) Use your equation to determine the population of the town in 2008.