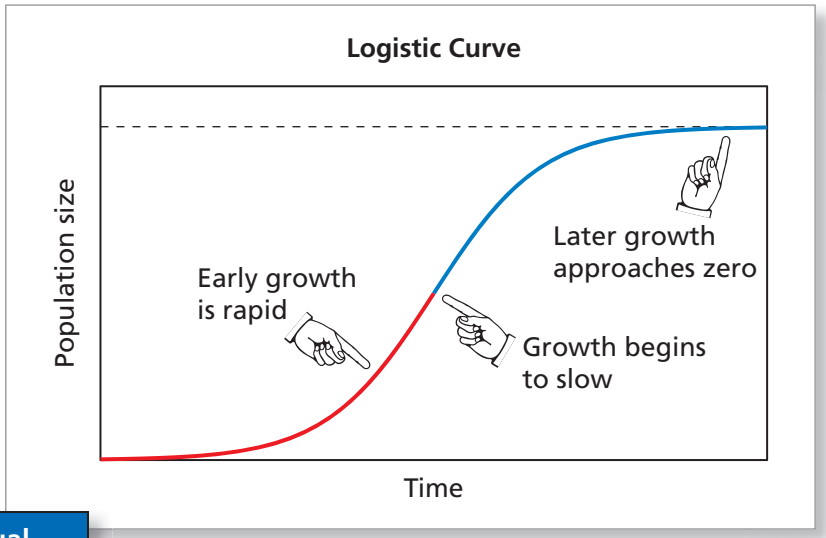
Extending Concepts

Logistic Growth **In general, the size of a population (people, bacteria, cancer cells, etc.) follows a logistic growth pattern. The graph illustrates the growth patterns of a logistic curve. In Exercises 21–23, use the graph.**



21. Compare an exponential curve to a logistic curve.

22. Why is the size of a population over time better represented by a logistic growth model than an exponential growth model?

23. Based on the information in the table, what part of the graph represents the world population? Explain.

Year	World Population (in billions)	Annual Growth Rate
1980	4.5	1.8%
1985	4.9	1.7%
1990	5.3	1.6%
1995	5.7	1.4%
2010	6.9	1.1%

24. **Example 6** To find the annual growth rate represented by Moore's Law, use the formula for exponential growth, $A = P(1 + r)^n$. Because the number of transistors doubles every 2 years, you can substitute $2P$ for A and 2 for n in the formula. Then solve for r as shown. Suppose the number of transistors triples every two years. What is the annual growth rate?

$A = P(1 + r)^n$	Formula for exponential growth
$2P = P(1 + r)^2$	Substitute $2P$ for A and 2 for n.
$\frac{2P}{P} = \frac{P(1 + r)^2}{P}$	Divide both sides by P.
$2 = (1 + r)^2$	Simplify.
$\sqrt{2} = 1 + r$	Take the square root of each side.
$\sqrt{2} - 1 = r$	Subtract 1 from each side.

Year	Tuition
1	\$6200.00
3	\$8252.20

Tuition **In Exercises 25 and 26, use the table.**

25. What is the annual growth rate of tuition?

26. At this rate, what will tuition be in three more years?