34. **TAKS REASONING** Find two infinite geometric series whose sums are each 5.

CHALLENGE Specify the values of x for which the given infinite geometric series has a sum. Then find the sum in terms of x.

35. $1 + 4x + 16x^2 + 64x^3 + \cdots$

36. $6 + \frac{3}{2}x + \frac{3}{8}x^2 + \frac{3}{32}x^3 + \cdots$

PROBLEM SOLVING

EXAMPLE 4 on p. 822 for Exs. 37–39

37. **TIRE SWING** A person is given one push on a tire swing and then allowed to swing freely. On the first swing, the person travels a distance of 14 feet. On each successive swing, the person travels 80% of the distance of the previous swing. What is the total distance the person swings?

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38. **BUSINESS** A company had a profit of \$350,000 in its first year. Since then, the company's profit has decreased by 12% per year. If this trend continues, what is an upper limit on the total profit the company can make over the course of its lifetime? *Justify* your answer using an infinite geometric series.

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39. **TAKS REASONING** In 1994, the number of cassette tapes shipped in the United States was 345 million. In each successive year, the number decreased by about 21.7%. What is the total number of cassettes that will ship in 1994 and after if this trend continues?

(A) 420 million (B) 440 million (C) 615 million (D) 1.59 billion

40. **TAKS REASONING** Can the Greek hero Achilles, running at 20 feet per second, ever catch up to a tortoise that runs 10 feet per second if the tortoise has a 20 foot head start? The Greek mathematician Zeno said no. He reasoned as follows:

When Achilles runs 20 feet, the tortoise will be in a new spot, 10 feet away.

Then, when Achilles gets to that spot, the tortoise will be 5 feet away.

Achilles will keep halving the distance but will never catch up to the tortoise.

In actuality, looking at the race as Zeno did, you can see that both the distances and the times Achilles required to traverse them form infinite geometric series. Using the table, show that both series have finite sums. Does Achilles catch up to the tortoise? *Explain*.

Distance (ft)	20	10	5	2.5	1.25	0.625	. . .
Time (sec)	1	0.5	0.25	0.125	0.0625	0.03125	. . .