EXAMPLE 2 Comparing Terms for a Home Mortgage

You take out a home mortgage for $250,000 at 6%. Compare the total interest you pay for terms of (a) 20 years, (b) 30 years, and (c) 40 years.

The median price of a new home in the United States during 2010 was about $221,000.

SOLUTION

a. $M = 250{,}000\left[\dfrac{0.005}{1-\left(\dfrac{1}{1.005}\right)^{240}}\right] = \$1791.08$ 20 years

Your payments total 240(1791.08) = $429,859.20.
The total interest you pay over 20 years is $179,859.20.

b. $M = 250{,}000\left[\dfrac{0.005}{1-\left(\dfrac{1}{1.005}\right)^{360}}\right] = \$1498.88$ 30 years

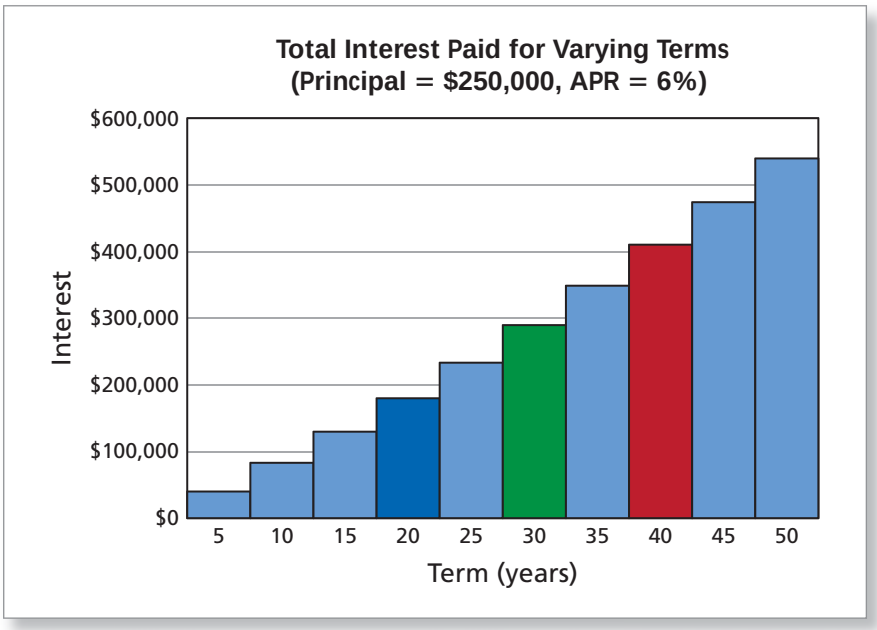
Your payments total 360(1498.88) = $539,596.80. The total interest you pay over 30 years is $289,596.80.

c. $M = 250{,}000\left[\dfrac{0.005}{1-\left(\dfrac{1}{1.005}\right)^{480}}\right] = \$1375.53$ 40 years

Your payments total 480(1375.53) = $660,254.40. The total interest you pay over 40 years is $410,254.40.

	A	B
1	Term (years)	Monthly Payment
2	5	$4,833.20
3	10	$2,775.51
4	15	$2,109.64
5	20	$1,791.08
6	25	$1,610.75
7	30	$1,498.88
8	35	$1,425.47
9	40	$1,375.53
10	45	$1,340.71
11	50	$1,316.01

This table shows the monthly payment for a mortgage of $250,000 at 6% for varying terms. Notice that increases in the term eventually amount to insignificant reductions in the monthly payment.



Checkpoint

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You take out a home mortgage for $250,000 at 12%. Compare the total interest you pay for the following terms.

d. 20 years **e.** 30 years **f.** 40 years

g. Are your answers double those in Example 2? What can you conclude from this?