

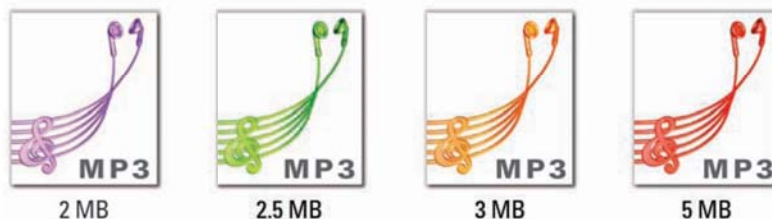


### EXAMPLE 3 Write an inverse variation model

**MP3 PLAYERS** The number of songs that can be stored on an MP3 player varies inversely with the average size of a song. A certain MP3 player can store 2500 songs when the average size of a song is 4 megabytes (MB).



- Write a model that gives the number  $n$  of songs that will fit on the MP3 player as a function of the average song size  $s$  (in megabytes).
- Make a table showing the number of songs that will fit on the MP3 player if the average size of a song is 2 MB, 2.5 MB, 3 MB, and 5 MB as shown below. What happens to the number of songs as the average song size increases?



#### Solution

**STEP 1** Write an inverse variation model.

$$n = \frac{a}{s} \quad \text{Write general equation for inverse variation.}$$

$$2500 = \frac{a}{4} \quad \text{Substitute 2500 for } n \text{ and 4 for } s.$$

$$10,000 = a \quad \text{Solve for } a.$$

► A model is  $n = \frac{10,000}{s}$ .

**STEP 2** Make a table of values.

Average size of song (MB), $s$	2	2.5	3	5
Number of songs, $n$	5000	4000	3333	2000

► From the table, you can see that the number of songs that will fit on the MP3 player decreases as the average song size increases.



#### GUIDED PRACTICE for Examples 1, 2, and 3

Tell whether  $x$  and  $y$  show *direct variation*, *inverse variation*, or *neither*.

1.  $3x = y$

2.  $xy = 0.75$

3.  $y = x - 5$

The variables  $x$  and  $y$  vary inversely. Use the given values to write an equation relating  $x$  and  $y$ . Then find  $y$  when  $x = 2$ .

4.  $x = 4, y = 3$

5.  $x = 8, y = -1$

6.  $x = \frac{1}{2}, y = 12$

7. **WHAT IF?** In Example 3, what is a model for the MP3 player if it stores 3000 songs when the average song size is 5 MB?