

7.2 Graph Exponential Decay Functions

TEKS 2A.4.B, 2A.11.B, 2A.11.C, 2A.11.F



Before

You graphed and used exponential growth functions.

Now

You will graph and use exponential decay functions.

Why?

So you can model depreciation, as in Ex. 31.

Key Vocabulary

- exponential decay function
- decay factor

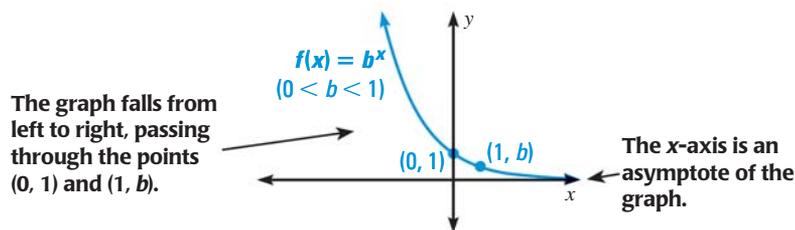
In Lesson 7.1 you studied exponential growth functions. In this lesson, you will study **exponential decay functions**, which have the form $y = ab^x$ where $a > 0$ and $0 < b < 1$. The base b of an exponential decay function is called the **decay factor**.

KEY CONCEPT

For Your Notebook

Parent Function for Exponential Decay Functions

The function $f(x) = b^x$, where $0 < b < 1$, is the parent function for the family of exponential decay functions with base b . The general shape of the graph of $f(x) = b^x$ is shown below.



The domain of $f(x) = b^x$ is all real numbers. The range is $y > 0$.

EXAMPLE 1 Graph $y = b^x$ for $0 < b < 1$

Graph $y = \left(\frac{1}{2}\right)^x$.

Solution

STEP 1 Make a table of values.

x	-3	-2	-1	0	1	2
y	8	4	2	1	$\frac{1}{2}$	$\frac{1}{4}$

STEP 2 Plot the points from the table.

STEP 3 Draw, from *right to left*, a smooth curve that begins just above the x -axis, passes through the plotted points, and moves up to the left.

