EX 1/
IDENTIFY INVERSE VARIATION
An inverse variation is a relation between two variables such that as one variable increases, the other decreases proportionally. The product (multiplication) of x and y in the table must be constant.

TRY IT:
Determine if each table of values represents an inverse variation.

<table>
<thead>
<tr>
<th>x</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>5</th>
<th>6</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>25.5</td>
<td>12.75</td>
<td>8.50</td>
<td>5.10</td>
<td>4.25</td>
<td>1.70</td>
</tr>
</tbody>
</table>

Yes, this represents an inverse variation.

No, it does not represent an inverse variation.

EX 2/
USE INVERSE VARIATION
In an inverse variation, \( \frac{x}{10} = 3 \) when \( y = 3 \). Write an equation to represent the inverse variation. Then find the value of \( y \) when \( x = -6 \).

\[
y = \frac{k}{x} \quad \text{plug in } x=6, y=3 \\
3 = \frac{k}{10} \quad \text{solve for } k \\
30 = k
\]

After solving for \( k \), write an equation for the inverse variation.

\[
y = \frac{k}{x} \quad \text{plug in } k \\
y = \frac{30}{x}
\]

To find the value of \( y \) when \( x = -6 \), substitute \(-6\) for \( x \) in the equation.

\[
y = \frac{30}{x} \quad \text{plug in } x \\
y = \frac{-5}{x} \\ \\
y = -5 \\
\text{when } x = -6, y = -5
\]
TRY IT:
In an inverse variation, \( x = 6 \) and \( y = \frac{1}{2} \).

a. What is the equation that represents the inverse variation?

\[
y = \frac{k}{x} \quad \frac{1}{2} = \frac{k}{6} \quad 3 = k
\]

b. What is the value of \( y \) when \( x = 15 \)?

\[
y = \frac{3}{x} \quad y = \frac{3}{15} \quad y = \frac{1}{5}
\]

EX 3//
GRAPH THE RECIPROCAL FUNCTION
The reciprocal function maps every non-zero real number to its reciprocal.

**Step 1:** Consider the domain and range.

- **Domain:** \( \{ x \mid x \neq 0 \} \)
- **Range:** \( \{ y \mid y \neq 0 \} \)

**Step 2:** Graph the function.

**Step 3:** Observe the graph of \( y = \frac{1}{x} \) as it approaches positive infinity and negative infinity.

As \( x \) gets larger, the denominator gets larger and the value of the function approaches zero.

An **asymptote** is a line that a graph approaches. Asymptotes guide the end behavior of a function.
TRY IT:
Graph the function $y = \frac{10}{x}$. What are the domain, range, and asymptotes of the function?

Vertical asymptote:
$x = 0$

Horizontal asymptote:
$y = 0$

Domain:
$\{x | x \neq 0\}$

Range:
$\{y | y \neq 0\}$

EX 5//
GRAPH TRANSLATIONS OF THE RECIPROCAL FUNCTION
Graph $g(x) = \frac{1}{x-3} + 2$. What are the equations of the asymptotes? What are the domain and range?

$q(x) = \frac{1}{x-h} + k$

Vertical asymptote:

Horizontal asymptote:

Domain:

Range: