

6K / CLASSROOM LESSON

Inverse variation

Name: _____ Class: _____ Date: _____

Today you will

- Build and use a model with a constant product.
- Read inverse graphs and explain their branches and excluded values.

Keep these ideas

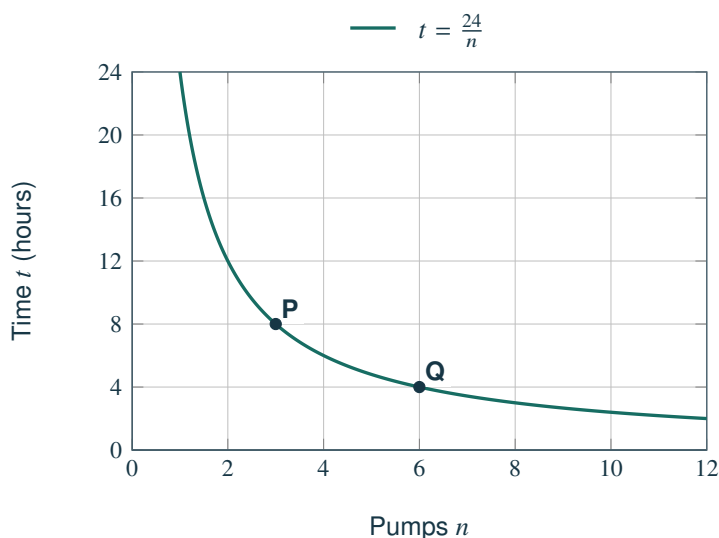
Inverse variation has $y = \frac{k}{x}$, so the product $xy = k$ stays constant.

For non-zero k , the graph is a hyperbola; it never reaches either axis and $x \neq 0$.

Multiplying x by a positive factor divides y by that factor. A decreasing straight line is not an inverse graph.

Worked example

Three identical pumps empty a tank in 8 hours. The time is inversely proportional to pump count. Find the model and the time for six pumps.



1. $k = nt = 3 \times 8 = 24$ pump-hours, so $t = \frac{24}{n}$.

2. With six pumps, $t = \frac{24}{6} = 4$ hours.

Answer

$t = \frac{24}{n}$; six pumps take 4 hours.

The worked model for positive pump counts.

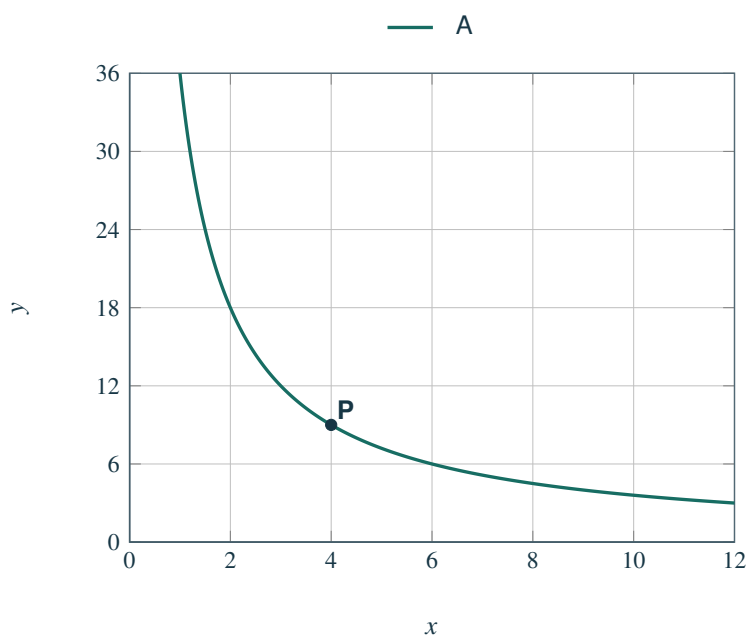
Your turn

1. y varies inversely with x . If $y = 15$ when $x = 4$, find k and the model.

2. For $y = \frac{60}{x}$, find x when $y = 8$.

Apply it on the graph

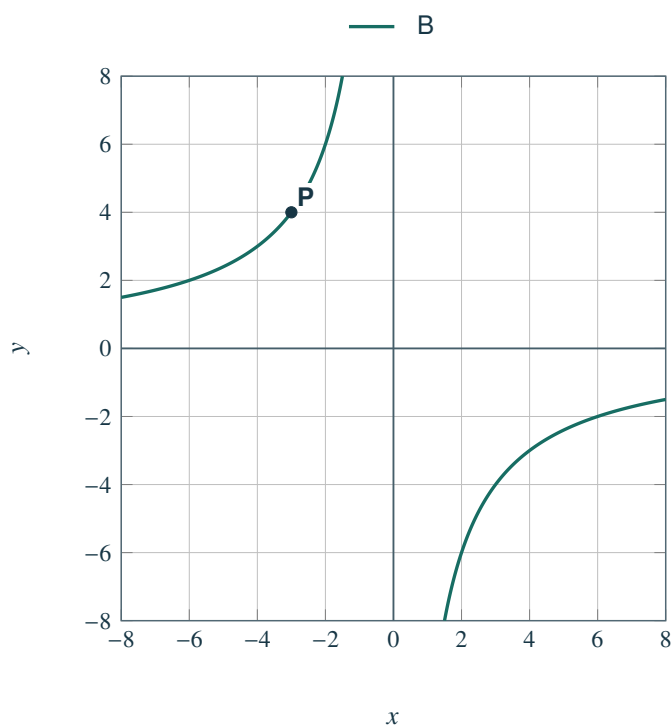
Write your calculations beside each diagram. Label any points or curves you add.



Questions 3-4: Positive branch A, including the given point $P(4, 9)$.

3. Graph A shows inverse variation. Use the given point $P(4, 9)$ to find k and write its equation.

4. Use the same graph as Question 3. Find y at $x = 9$. Describe what happens to y when x triples from 3 to 9.



Questions 5-6: Both branches of inverse graph B; $P(-3, 4)$ is given.

5. Graph B shows inverse variation. Use $P(-3, 4)$ to find k and its equation. State which quadrants contain its two branches.

6. Use the same graph as Question 5. Does B cross either axis? Explain why, and state the excluded value of x .
