

Objectives

- Solve problems involving direct, inverse, joint, and combined variation
- Find inverses of functions

Vocabulary

Direct variation
Constant of variation
Joint variation
Inverse variation
Combined variation

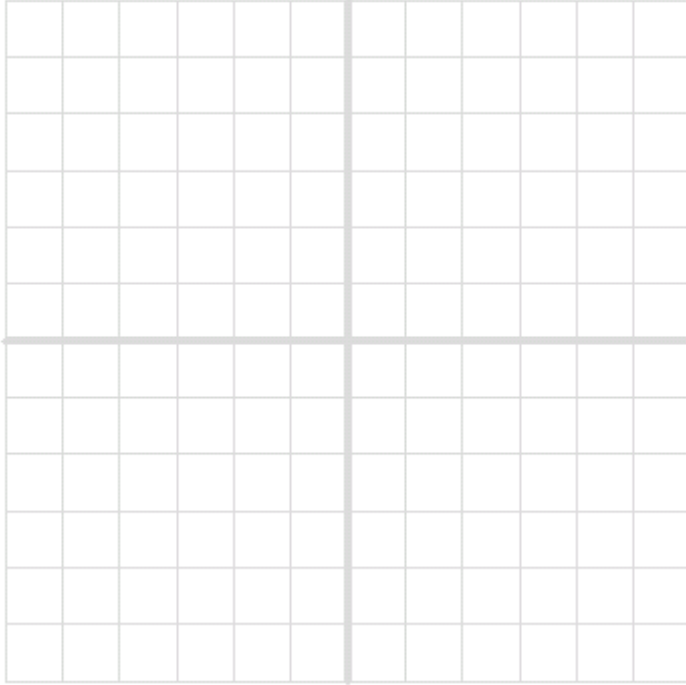
Example 1

Given y varies directly as x , and $y = 14$, when $x = 3.5$. Write and graph the direct variation function.



Try it!

Given y varies directly as x , and $y = 14$, when $x = 3.5$. Write and graph the direct variation function.



Example 2

The circumference of a circle C varies directly as the radius r , and $C = 7\pi$ ft, when $r = 3.5$ ft. Find r when $C = 4.5\pi$ ft.

Try it!

The perimeter of a regular dodecagon varies directly as the side length s , and $P = 18$ in, when $s = 1.5$ in. Find s when $P = 75$ in.

Example 3**Solving Joint Variation Problems**

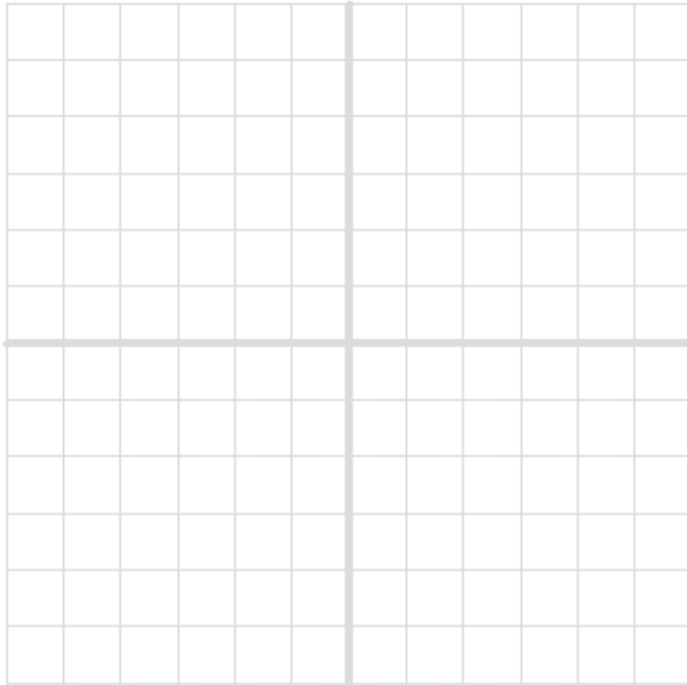
The area A of a triangle varies jointly as the base b and the height h , and $A = 12m^2$ when $b = 6$ m and $h = 4$ m. Find b when $A = 36m^2$ and $h = 8$ m.

Try it!

The lateral surface area L of a cone varies jointly as the base radius r and the slant height l , and $L = 63\pi m^2$ when $r = 3.5m$ and $l = 18m$. Find r to the nearest tenth when $L = 8\pi m^2$ and $l = 5m$.

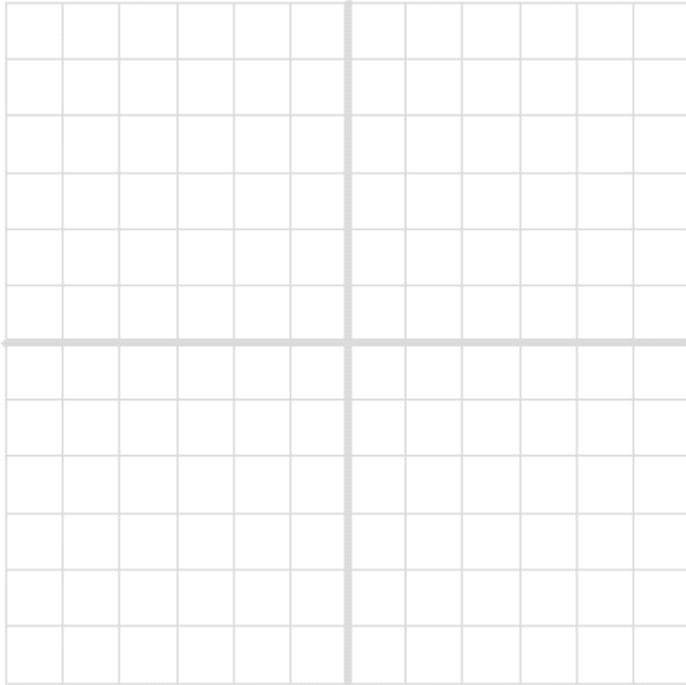
Example 4

Given y varies inversely as x , and $y = 3$, when $x = 8$. Write and graph the inverse variation function.



Try it!

Given y varies inversely as x , and $y = 4$, when $x = 10$. Write and graph the inverse variation function.



Example 5**Community Service Application**

The time t it takes for a group of volunteers to construct a house varies inversely as the number of volunteers v . If 20 volunteers can build a house in 62.5 working hours, how many volunteers would it need to build a house in 50 working hours?

Try it!

How many working hours would it take 15 volunteers to build a house?

Direct Variation

$$y = kx \rightarrow k = \frac{y}{x}$$

Constant ratio

Inverse Variation

$$y = \frac{k}{x} \rightarrow k = xy$$

Constant product

Example 6

Determine whether each data represent a direct variation, and inverse variation, or neither.

x	3	8	10
y	9	24	30

x	1	40	26
y	0.2	8	5.2

