

Section 8-1 Inverse Variation

Students will be able to
 -recognize and use inverse variation
 -use joint and other variations

Aug 18-2:52 PM

SOLVE IT! Getting Ready!

You have 20 bags of mulch. You plan to spread the mulch from all the bags to make a rectangular layer that is 3-in. thick. How many square feet can you cover? If l and w represent the length and width of the rectangle in feet, what equation relates l and w ? Justify your reasoning.

$V = lwh$
 $40 = \frac{Lw(30)}{12}$ $(w = 160ft^2)$

Aug 18-2:52 PM

In any rectangle with a given area, the longer the length of one side, the shorter the length of the adjacent side.

-If a product is constant, where it is positive, a decrease in the value of one factor must accompany an increase in the value of the other factor.

Aug 18-2:52 PM

Remember we talked about direct variation, $y = kx$.

Inverse variation can be $xy = k$, $y = k/x$, or $x = y/k$.

When two variables vary inversely, as one variable increases, the other decreases proportionally.

Aug 18-2:52 PM

Is the relationship inverse variation, direct variation, or neither? Write a function that models the variation.

a.

x	y
0.2	8
0.5	20
1.0	40
1.5	60

 direct $y = 40x$

b.

x	y
0.2	40
0.5	16
1.0	8.0
2.0	4.0

 Inverse $y = \frac{8}{x}$ $46 = k \cdot \frac{1}{2}$ $8 = k$ $8 = \frac{8}{1}$ $4 = \frac{8}{2}$

c.

x	y
0.5	40
1.2	12
2	10
2.5	6

 $\frac{10 \cdot k}{2} = k \cdot 5$ $12 = 96$

Aug 18-2:52 PM

The general rule for inverse variation is:

$y = \frac{k}{x}$ $8 \cdot -7 = \frac{k}{8}$ $k = -56$

Suppose y and x vary inversely, and $x = 8$, when $y = -7$. What is the function that models the inverse variation? What does the graph of it look like? What is y when $x = 2$?

$y = -\frac{56}{x}$ $y = -\frac{56}{2} = -28$

Aug 18-2:52 PM

Geometry uses many formulas that represent variation.

- Simply like perimeter or area of a square
- Difficult like volume of a cone, has three or more variables.

When one quantity varies with respect to two or more quantities, you have a combined variation.

When one quantity varies directly with two or more quantities it is a joint variation.

Aug 18-2:52 PM

Combined Variation:

Examples:

z varies ^{mult.} jointly with x and y $z = kxy$

z varies jointly with x and y and inversely with w $z = \frac{kxy}{w}$

z varies directly with x and inversely with the product wy $z = \frac{kx}{wy}$

Aug 18-2:52 PM

Back to the opening problem. The number of bags of mulch you need varies jointly with the area to be mulched a in square feet and the depth of the mulch d in feet. If you need 10 bags to mulch 120 ft² to a depth of 3 in., how many bags do you need to mulch 200 ft² to a depth of 4 in.?

Aug 18-2:52 PM

The volume of gas varies directly with its temperature and inversely with pressure. Volume is 100 m³ when the temperature is 150 K and the pressure is 15 lb/cm². What is the volume when the temp is 250 K and the pressure is 20 lb/cm².

$$V = \frac{KT}{P} \quad K=10$$

$$\frac{100}{10} = \frac{K \cdot 150}{15 \cdot 10}$$

$$V = \frac{10(250)}{20} = 125$$

Aug 18-2:52 PM

Hwk: pg 503 - 504
#6, 8, 14, 20, 22, 25,
26 - 28 all, 31 - 38 all

Aug 18-2:52 PM

Aug 18-2:52 PM



Aug 18-2:52 PM