

today is the beginning of the rest of the year

tabula rasa



The time t it takes to do a job varies inversely as the number of people P who work on the job (each person works at approximately the same rate).

One group has 9 people in it, and it took them 72 hours to create a frame for a house.

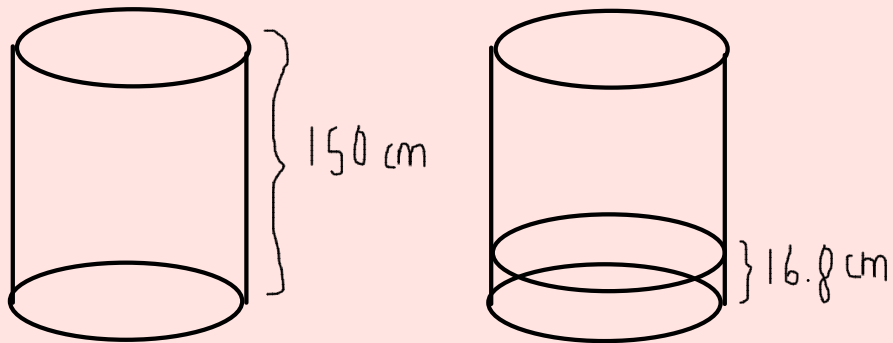
My group has 12 people in it. How long will it take us to build a house frame?



Today's menu:

1. **direct** variation
2. **indirect** variation
3. other kinds of variation

meteorologists found that 150 cm of snow will melt to 16.8 cm of water. to how many centimeters of water will 200 cm of snow melt?



what do we need to assume?

direct variation:

$$y=kx \text{ (k is a positive constant)*}$$

*k is called the variation constant

you try!

Find **the variation constant (k)** and **the equation of variation** in which y varies directly with x, and $y=32$ when $x=2$.

you are driving a bus 100 miles.
how long will it take you if you go at...

1 mph?

5 mph?

10 mph?

20 mph?

50 mph?

100 mph?

21.32 mph?

in this case...

$$T = \frac{100}{r}$$

inverse variation:

$$y = k/x \text{ (k is a positive constant)*}$$

*k is called the variation constant

you try!

Find the variation constant and an equation of variation in which y varies inversely as x, and $y = 16$ when $x = 0.3$.

The time t it takes to do a job **varies inversely** as the number of people P who work on the job (each person works at approximately the same rate).

One group has 9 people in it, and it took them 72 hours to create a frame for a house.

My group has 12 people in it. How long will it take us to build a house frame?

direct variation

the amount of money earned **varies directly** with the number of hours worked.

inverse variation

the amount of time it takes to staple 1,000 envelopes **varies inversely** to the number of people stuffing envelopes.

but not everything in the world
varies directly or inversely

Other types of variation

$y=kx^n$: y varies directly as the n th power of x

$y=k/x^n$: y varies inversely as the n th power of x

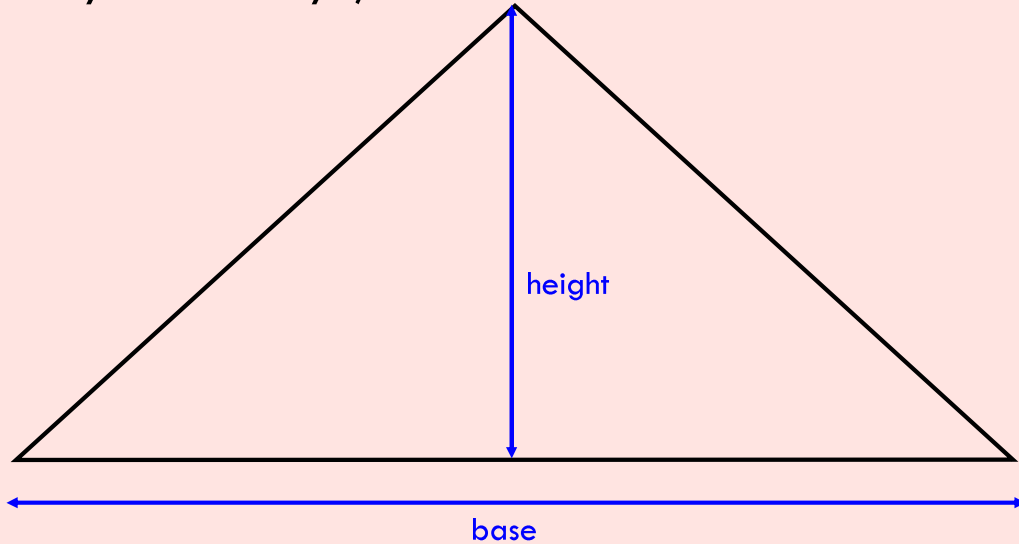
let's try!

y varies inversely as the square of x , and
 $y=0.15$ when $x=0.1$

you try!

The intensity I of light from a light bulb varies inversely as the square of the distance d from the bulb. Suppose that I is 90 W/m^2 (watts per square meter) when the distance is 5 m. How much **farther** would it be to a point where the intensity is 40 W/m^2 .

You are going to build a 100 ft^2 triangular garden. How are the base and height related to each other? (directly? indirectly?)



**With your desk partner,
try to answer the following:**

1. If y varies directly as x^2 , explain why doubling x would not cause y to be doubled as well. (And as a follow up: what does happens to y ?)
2. If y varies directly as x and x varies inversely as z , how does y vary with regard to z ? Why?

Homework (*light*):

1. Type up **1 paragraph** giving yourself a participation grade for this quarter (e.g. 85%), and explaining why you deserve it. Be specific.

2. Section 3.7: 1-9odd, 13, 14, 20-23.