

Direct proportion

Use it when x changes by a percentage or a scale factor and you need the change in y .

- 1 Statement**
Write it with $\propto$ and the power.

$$y \propto x^n$$

*no k needed:
only the change is asked for*

- 2 Multiplier**
Turn the change in x into a multiplier.

$$\text{up } r\%: \times \frac{100 + r}{100}$$

$$\text{down } r\%: \times \frac{100 - r}{100}$$

doubles: $\times 2$, halves: $\times 0.5$

- 3 Through the power**
 $x \times m$ gives $y \times m$ to the same power.

$$y \times m^n$$

$$y \propto x^2: \times m^2$$

$$y \propto \sqrt{x}: \times \sqrt{m}$$

- 4 Inversely?**
Divide by it instead.

$$y \propto \frac{1}{x^n}$$

$$y \times \frac{1}{m^n}$$

x goes up, y goes down

- 5 New value**
Multiply the old y by the multiplier.

$$\text{new } y = \boxed{\text{old } y} \times \boxed{\text{multiplier}}$$

asked for the percentage? go to 6

- 6 Percentage change**
Take 1 from the multiplier and write it as a percentage.

$$\boxed{(\text{multiplier} - 1) \times 100\%}$$

less than 1? it is a decrease

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