Worded Direct Proportion Problems

The weight of a piece of wire is directly proportional to its length. A piece of wire is 25 cm long and has a weight of 6 grams. Another piece of the same wire is 30 cm long. Calculate the weight of the 30 cm piece of wire.

7.2g

$W = 0.24L$

In a spring, the tension, T Newtons, is directly proportional to its extension, x cm. When the tension is 300 Newtons, the extension is 12 cm.
(a) Find a formula for T in terms of x.
(b) Calculate the tension, in Newtons, when the extension is 15 cm.

(b) 375 N

(a) $T = 25x$

The time, T seconds, it takes a kettle to boil some water is directly proportional to the mass of water, m kg, in the kettle. When $m = 250$, $T = 300$. Find T when $m = 400$.

$T = km$

$300 = k \times 250$

$k = 1.2$

$T = 1.2m$

$T = 1.2 \times 400$

$T = 480$ s

In a factory, chemical reactions are carried out in cylindrical containers. The time, T minutes, the chemical reaction takes is directly proportional to the square of the radius, R cm, of the cylindrical container. When $R = 12, T = 72$. Find the value of T when $R = 15$.

$T = kR^2$

$72 = k \times 12^2$

$k = 0.5$

$T = 0.5R^2$

$T = 0.5 \times 15^2$

$T = 112.5$ min

The amount of clay used to make a statue is directly proportional to the cube of the height of the statue. A statue which is 10 cm tall requires 500 cm^3 of clay. How much clay is required for a similar statue which is twice as tall?

$V = kh^3$

$500 = k \times 10^3$

$k = 0.5$

$V = 0.5h^3$

$V = 0.5 \times 20^3$

$V = 4000 cm^3$