Changing the subject of a formula

Note Title 26/04/2012

– more examples

① Make x the subject of:

$$\frac{x^2}{a} - b = c \qquad \text{(first make } x^2 \text{ subject)}$$

$$(+b) \qquad (+b)$$

$$\frac{x^2}{a} = b + c$$

$$(\times a) \qquad (\times a)$$

$$x^2 = a(b+c)$$

last step:- $(\sqrt{\ }) \qquad (\sqrt{\ })$

$$x = \sqrt{a(b+c)}$$

② Make x the subject of.

$$\frac{x-a}{x+b} = c$$

$$\times (x+b) \qquad \times (x+b)$$

$$x - a = c(x+b)$$

Here the letter 'x' appears more than once. So we need to get all 'x' terms on one side and all "non-x" terms on the other side.

$$x - a = cx + bc$$

$$(+a) \qquad (+a)$$

$$x = cx + bc + a$$

$$(-cx) \qquad (-cx)$$

$$x - cx = bc + a$$

Factorize so that the letter x only appears once

$$x(1-c) = bc + a$$

Divide by the bracket:

$$x = \frac{bc + a}{1 - c}$$

③ Make x the subject of

$$p = \sqrt{s + \frac{x}{t}}$$

(square both sides)

$$p^2 = s + \frac{x}{t}$$

$(-s)$ $(-s)$

$$p^2 - s = \frac{x}{t}$$

$(\times t)$ $(\times t)$

$$t(p^2 - s) = x$$

④

$$P = \frac{\sqrt{x + Q}}{R}$$

$(\times R)$ $(\times R)$

$$PR = \sqrt{x + Q}$$

(square both sides)

$$(PR)^2 = x + Q$$

$(-Q)$ $(-Q)$

$$P^2R^2 - Q = x$$