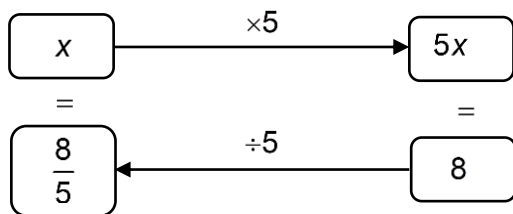


Model Answers: Rearranging Equations

Rearranging Equations
study guide

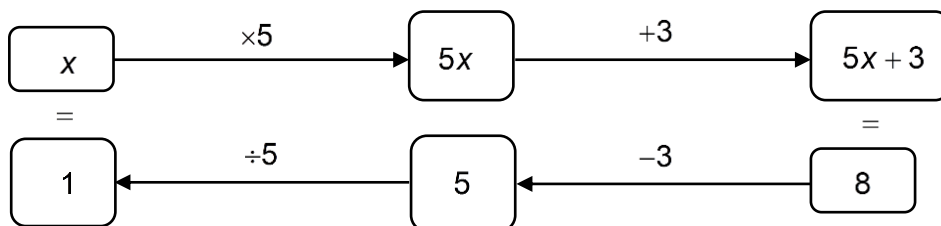


1.
a. $5x = 8$



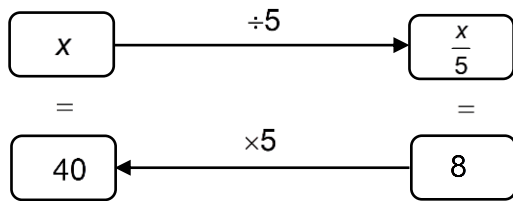
In other words you divide both sides by 5 to find that $x = \frac{8}{5} = 1.6$

- b. $5x + 3 = 8$



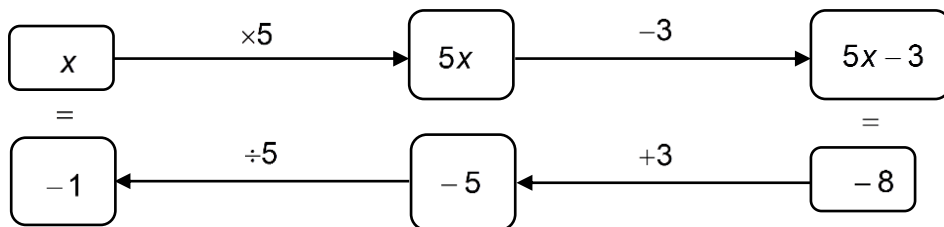
In other words you first subtract 3 from each side and then divide both sides by 5 to find that $x = 1$.

c. $\frac{x}{5} = 8$



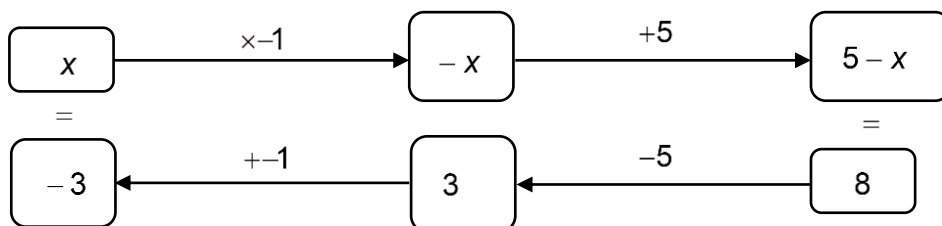
In other words you multiply both sides by 5 to find that $x = 40$.

d. $5x - 3 = -8$



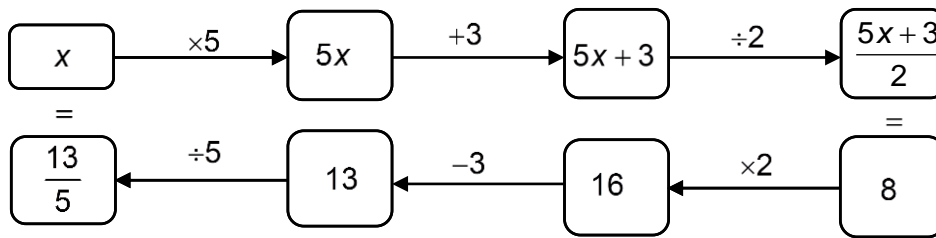
In other words you first add 3 to each side and then divide both sides by 5 to find that $x = -1$.

e. $5 - x = 8$



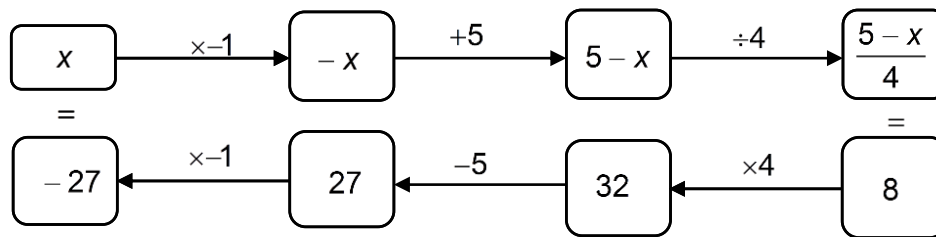
In other words you first subtract 5 from each side and then multiply both sides by -1 to find that $x = -3$.

f. $\frac{5x+3}{2} = 8$



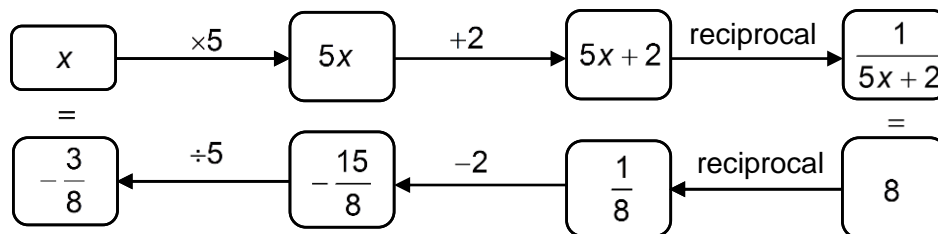
In other words you first multiply each side by 2, then subtract 3 from both sides and then divide both sides by 5 to find that $x = \frac{13}{5} = 2.6$.

g. $\frac{5-x}{4} = 8$



In other words you first multiply each side by 4, then subtract 5 from both sides and finally multiply both sides by sides by -1 to find that $x = -27$.

h. $\frac{1}{5x+2} = 8$ here the target is beneath the dividing line so you need to employ a reciprocal.

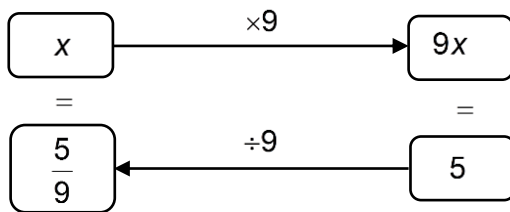


In other words you first take the reciprocal of each side, then subtract 2 from both sides and finally divide both sides by 5 to find that $x = -\frac{3}{8} = -0.375$.

- i. $5 - x = 8x$. Here you should notice that you have more than one instance of x and so you need to collect them all together before you use the flow chart method to solve the equation. If you add x to each side you can eliminate the $-x$ from the left hand side of the equation:

$$\begin{aligned} 5 - x + x &= 8x + x \\ 5 &= 9x \end{aligned}$$

You can now use the flow chart method:



In other words you divide both sides of the equation by 9 to give $x = \frac{5}{9} = 0.\dot{5}$.

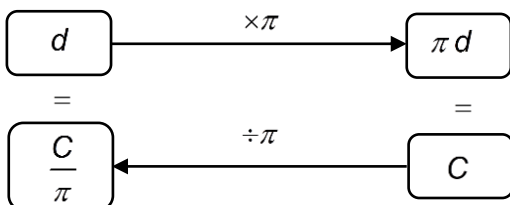
- j. $\frac{1}{5-x} = \frac{1}{8x}$. Here, as with the previous question, you have more than one instance of x and so you must collect them together. Notice that both the x 's are beneath the dividing line so if you take the reciprocal of both sides you get:

$$5 - x = 8x$$

Which is identical the previous question.

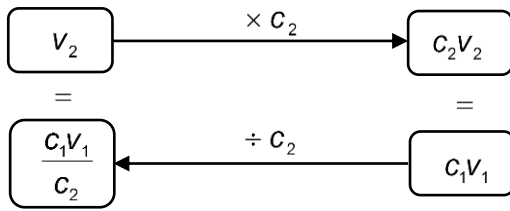
2.

- a. Transpose $C = \pi d$ for d .



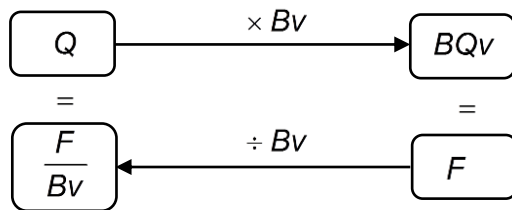
To transpose for d you divide both sides by π to give $d = \frac{C}{\pi}$.

b. Transpose $c_1v_1 = c_2v_2$ for v_2 .



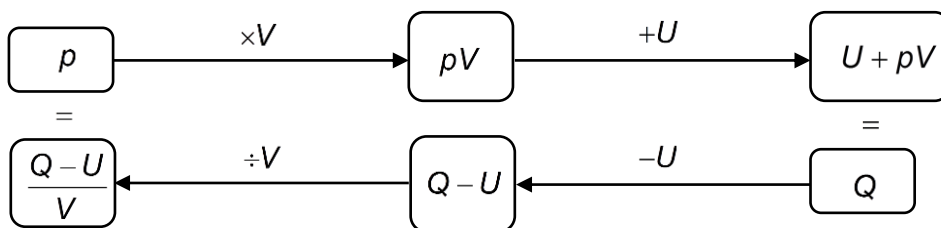
To transpose for v_2 you divide both sides by c_2 to give $v_2 = \frac{c_1v_1}{c_2}$.

c. Transpose $F = BQv$ for Q .



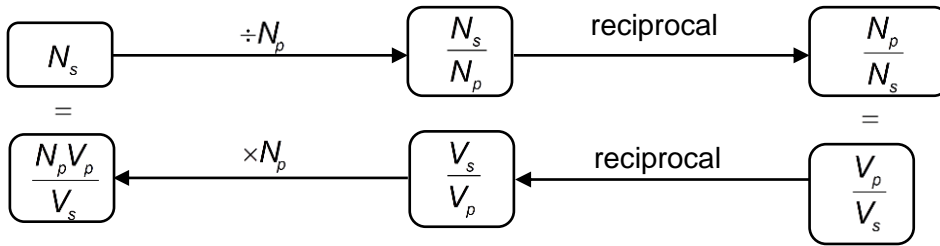
To transpose for Q you divide both sides by Bv to give $Q = \frac{F}{Bv}$.

d. Transpose $Q = U + pV$ for p



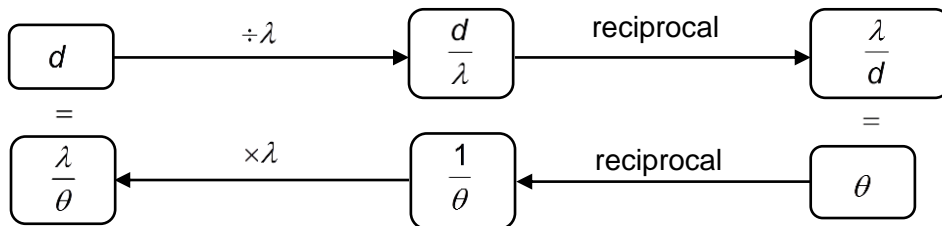
To transpose for p you subtract U from both sides and then divide both sides by V to give $p = \frac{Q - U}{V}$.

e. Transpose $\frac{V_p}{V_s} = \frac{N_p}{N_s}$ for N_s .



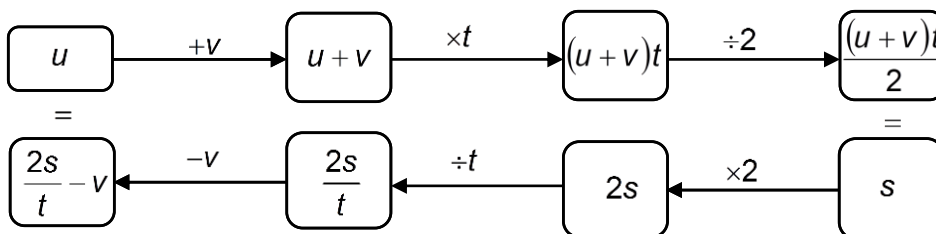
To transpose for N_s you take the reciprocal of both sides and then multiply both sides by N_p to give $N_s = \frac{N_p V_p}{V_s}$.

f. Transpose $\theta = \frac{\lambda}{d}$ for d .



To transpose for d you take the reciprocal of both sides and then multiply both sides by λ to give $d = \frac{\lambda}{\theta}$.

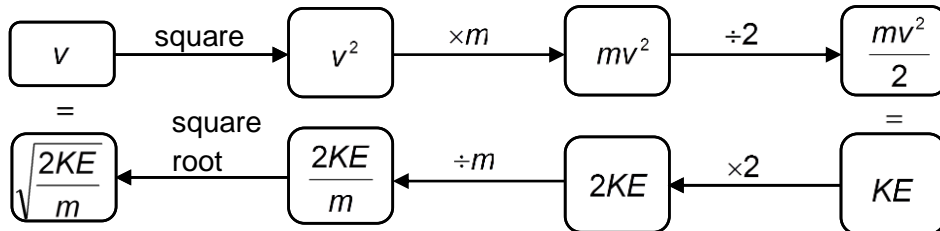
g. Transpose $s = \frac{(u+v)t}{2}$ for u .



To transpose for u you multiply both sides by 2, divide both sides by t and then subtract v from both sides to give $u = \frac{2s}{t} - v$.

h. Transpose $KE = \frac{1}{2}mv^2$ for v . To begin with it is beneficial to write the formula as

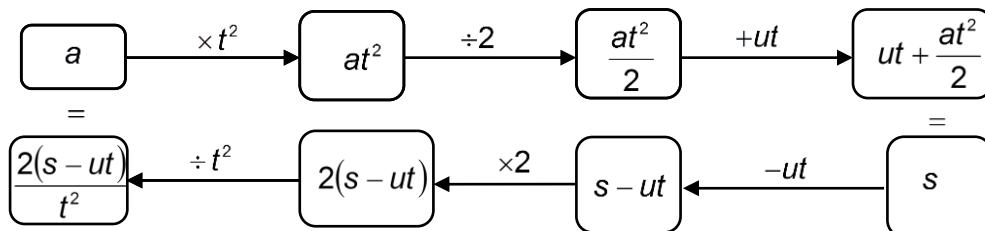
$$KE = \frac{mv^2}{2}.$$



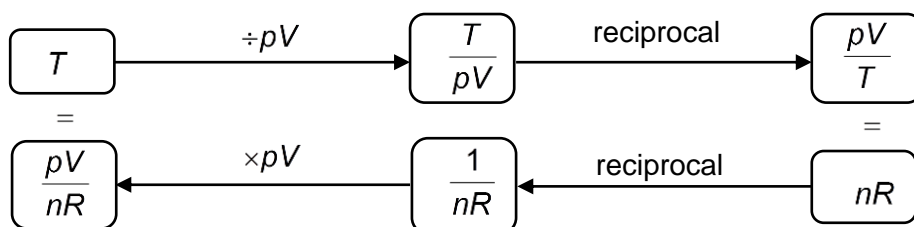
To transpose for v you multiply both sides by 2, divide both sides by m and then take the square root of both sides to give $v = \sqrt{\frac{2KE}{m}}$.

i. Transpose $s = ut + \frac{1}{2}at^2$ for a . To begin with it is beneficial to rewrite the formula as

$$s = ut + \frac{at^2}{2}.$$

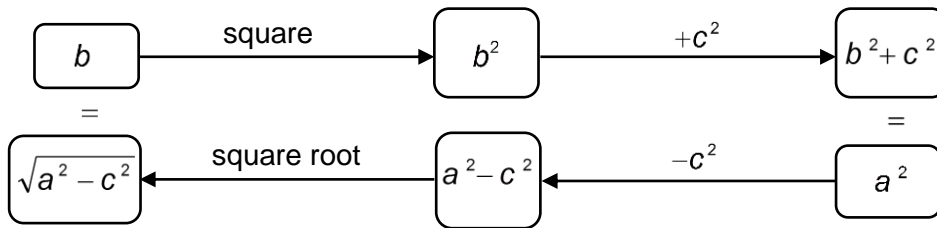


j. Transpose $\frac{pV}{T} = nR$ for T .



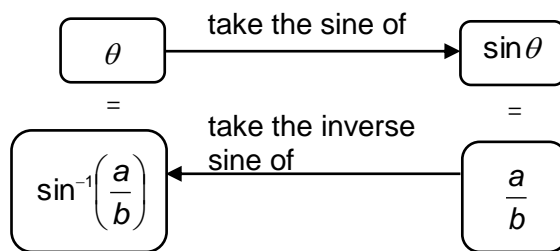
To transpose for T you take the reciprocal of both sides and then divide both sides by pV to give $T = \frac{pV}{nR}$.

k. Transpose $a^2 = b^2 + c^2$ for b .



To transpose for b you subtract c^2 from both sides and then take the square root of both sides to give $b = \sqrt{a^2 - c^2}$.

l. $\sin \theta = \frac{a}{b}$ for θ



To transpose for θ you take the inverse sine of both sides to give $\theta = \sin^{-1}\left(\frac{a}{b}\right)$.



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