Lesson 3

GCSE Mathematics
Algebra, Rearranging Formulae

3.1 Drill

Photograph by Martin Hansen, January 2025

Question 1

In algebra, there is one golden rule for manipulating equations.
What is that rule ?

Question 2

Quick 'In your head' Questions.
In each of the following, there is one manipulation that takes you from the question to the answer and so there is no need for any working.

(i) Make x the subject

$$x - 4.5 = m$$

(ii) Make x the subject

$$15x = h$$

(iii) Make x the subject

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

(iv) Make x the subject

$$\frac{1}{x} = \frac{11}{8}$$

Question 3

Write down the reciprocal of each of the following;

(i) $\frac{8}{x}$ **(ii)** $\frac{2w}{3x^2}$ **(iii)** $\frac{m + 3n}{4k}$

(iv) 3 **(v)** x **(vi)** $5k + p$

(vii) $\frac{7}{p + q}$ **(viii)** $\frac{1}{7}$ **(ix)** $\frac{1}{x}$

Question 4

Showing full working, make x the subject

$$mx - 8n = 3k$$

Question 5

Showing full working, make x the subject

$$7x - 8 = z^2 + y$$

Question 6

Showing full working, by first expanding the brackets, make x the subject

$$5\,(\,3x + y\,) = 11$$

Question 7

Showing full working, by first subtracting $11a$ from both sides, make x the subject

$$\frac{x}{5} + 11a = 4c$$

Write your answer without any brackets.

Question 8

Showing full working, make m the subject

$$5m + v = \sqrt{c}$$

Question 9

Quick 'In your head' Questions.

In each of the following, there is one manipulation that takes you from the question to the answer and so there is no need for any working.

(i) Make x the subject

$$4mx = v^2 + c$$

(ii) Make x the subject

$$\frac{x}{8\sqrt{p}} = f$$

(iii) Make x the subject

$$\frac{1}{x} = \frac{k^2 + 2}{m + \sqrt{n}}$$

(iv) Make x the subject

$$\frac{1}{x} = a + b - 5$$

Question 10

Without any working, make w the subject of the formula

$$w - 4pq = m^2$$

Question 11

Showing full working, by first subtracting $3g$ from both sides, make x the subject;

$$\frac{5}{x} + 3g = 7k$$

Question 12

Showing full working, make x the subject;

$$\frac{7f}{x} - 13 = h$$

Question 13

Showing full working, by first taking the reciprocal of both sides, make x the subject;

$$\frac{1}{x + 5pq} = \frac{a}{7b}$$

Question 14

Showing full working, by first adding 42 to both sides, make x the subject;

$$\frac{1 + m}{x} - 42 = u$$

Question 15

Showing full working, by first subtracting $3h$ from both sides, make x the subject;

$$\frac{4}{3z^2 + x} + 3h = g - 1$$

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