## 2.6 Changing the Subject

1. Make s the subject of each of the following:

   (a) $2s - 8p = 14$ (b) $28 = 4s + r - s$ (c) $10 - 2s = 12r + 2s$

2. In each of the following, make y the subject:

   (a) $y + x = 6$ (b) $m + y = 2 - n$ (c) $\dfrac{k}{5} = \dfrac{y}{3}$

   (d) $3 + m = d + y$ (e) $5 = y - 3m$ (f) $2y + 6 = 48 + 2x$

3. (a) Given that $4a + b = c - a$, express a in terms of b and c.

   (b) Given that $x - y = 3z$, express y in terms of x and z.

   (c) Given that $pq = r$, express q in terms of p and r.

   (d) Given that $a + b = 8c + 7$, express c in terms of a and b.

4. Make a the subject of the following formulae:

   (a) $a + x = b$ (b) $a + h = k$ (c) $a - m = n$

   (d) $a - k = h$ (e) $a - b = c + d$ (f) $a + c = d + e$

   (g) $y + a = x$ (h) $z - a = 2k$ (i) $p = a - q$

   (j) $5k = p - a$ (k) $7k = p + a$ (l) $a - b - c = k^2$

   (m) $b - a + k = h^3$ (n) $m + n + a = k$ (o) $m - n - a = h$

   (p) $7k - h - a = 2a$ (q) $5pq - a = p^2 - q$ (r) $3xy + a = x^2 y$

   (s) $5a = 15$ (t) $ax = 3y$ (u) $xay = 3k$

   (v) $2xy = 3ak$ (w) $ak = p - q + k$ (x) $ax^2 = 5y - 4$

5. Make a the subject of the given formula.

   (a) $ax = y$ (b) $a(p - 4) = q$ (c) $ax + by = c$

   (d) $p(a + b) = c$ (e) $2a - 3m = 4a - 7$ (f) $5b - 2a = 3c$

   (g) $\dfrac{a}{m} + b = c$ (h) $x = \dfrac{2a}{3} + 5z$ (i) $\dfrac{p + a}{5} = 3p$

   (j) $R = m(a + g)$ (k) $2b = ax + a$ (l) $2m = 65 - 4a$

6. (a) The volume of a cylinder is given by

   $$V = \pi r^2 h$$

   (i) Make h the subject of this equation.

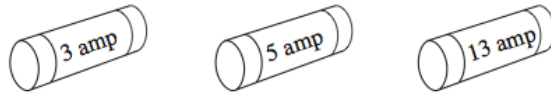   (ii) Find h when $r = 3$ cm and $V = 350$ cm^3.
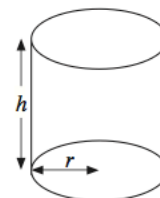
(b)   The total surface area is given by

$$s = 2\pi r^2 + 2\pi rh$$

   (i)   Make h the subject of this equation.

   (ii)   Find h when $r = 3$ cm and $s = 300$ cm^2.

7.   Electrical fuses are available as shown.

The correct fuse to use for an electrical appliance can be calculated using this formula,

$$F = \frac{P}{240}$$

where F = Fuse rating in amps,
                         P = Power rating in watts.

(a)   Which fuse should be fitted for a toaster with power rating 1100 watts?

(b)   An electric heater needs a 13 amp fuse. What is the largest power rating the heater could have?

(SEG)

8.   The length of a man's forearm (f cm) and his height (h cm) are approximately related by the formula

$$h = 3f + 90$$

(a)   Part of the skeleton of a man is found and the forearm is 20 cm long. Use the formula to estimate the man's height.

(b)   A man's height is 162 cm. Use the formula to estimate the length of his forearm.

(c)   George is 1 year old and he is 70 cm tall. Find the value the formula gives for the length of his forearm and state why this value is impossible.

(d)   Use the formula to find an expression for f in terms of h.

(MEG)

9.   Make t the subject of the formula

$$D = 5t + \pi t + 5w \qquad \text{(Edexcel)}$$

10.   The cost, in pounds, to hire a conference centre is calculated by using this formula.

$$\text{Cost} = 4 \times \text{number of people attending} + 250$$

(a)   Find the cost of hiring the conference centre when 200 people attend.

(b)   A company pays £650 to hire the conference centre. How many people attend the conference?

(AQA)

11. This is the payment plan for Donal's mobile phone. He receives a bill every month.

PAYMENT PLAN

£5 per month

PLUS

5p per minute

(a) In January, Donal did not make any calls. How much was his bill?

(b) In February, Donal made 100 minutes of calls. How much was his bill?

(c) In March, Donal's bill was £7.50. How many minutes of calls did he make?

(AQA)