

### Rearranging Formulae

1. Make  $t$  the subject of the formula  $u = \frac{t}{3} + 5$

$$\begin{array}{l} (-5) \quad u - 5 = \frac{t}{3} \quad (-5) \\ (\times 3) \quad 3(u - 5) = t \quad (\times 3) \\ (\text{expand}) \quad \underline{\underline{t = 3u - 15}} \quad (\text{expand}) \end{array}$$

Answer  $t = \dots\dots\dots$

(Total 2 marks)

2. Make  $x$  the subject of the formula

$$\begin{array}{l} w = x^2 + y \\ (-y) \quad w - y = x^2 \quad (-y) \\ (\sqrt{\quad}) \quad \underline{\underline{x = \sqrt{w - y}}} \quad (\sqrt{\quad}) \end{array}$$

Answer  $x = \dots\dots\dots \underline{\underline{x = \sqrt{w - y}}}$

(Total 2 marks)

3. (a) You are given the formula  $y = \frac{5+x}{x}$

Rearrange the formula to give  $x$  in terms of  $y$ .

$$\begin{array}{l} (\times x) \quad yx = 5 + x \quad (\times x) \\ (-x) \quad yx - x = 5 \quad (-x) \\ (\text{factorize}) \quad x(y - 1) = 5 \quad (\text{factorize}) \\ \left[ \div (y - 1) \right] \quad \underline{\underline{x = \frac{5}{y - 1}}} \quad \left[ \div (y - 1) \right] \end{array}$$

Answer  $x = \dots\dots\dots \underline{\underline{\frac{5}{y - 1}}}$

(3)

(Total 3 marks)

4. Make  $x$  the subject of the formula

$$y = \frac{3x+4}{x-3}$$

$$[x(x-3)]$$

(expand)

$$[-3x, +3y]$$

(factorise)

$$[\div(y-3)]$$

$$y(x-3) = 3x + 4$$

$$yx - 3y = 3x + 4$$

$$yx - 3x = 4 + 3y$$

$$x(y-3) = 4 + 3y$$

$$x = \frac{4 + 3y}{y-3}$$

Answer  $x = \dots\dots\dots$

(Total 4 marks)

$$[x(x-3)]$$

(expand)

$$[-3x, +3y]$$

(factorise)

$$[\div(y-3)]$$

5. Make  $u$  the subject of the formula

$$s = \frac{1}{2}(u+v)t \quad \leftarrow \times \text{ by } \frac{1}{2} \text{ is the same as } \div 2$$

$$2s = (u+v)t$$

( $\times 2$ )

$$2s = (u+v)t \quad (\times 2)$$

( $\div t$ )

$$\frac{2s}{t} = u+v \quad (\div t)$$

( $-v$ )

$$u = \frac{2s}{t} - v \quad (-v)$$

Answer  $u = \dots\dots\dots$

(Total 3 marks)

6. Rearrange

$$y = \frac{xy+2}{3x-4}$$

to make  $x$  the subject.  
Simplify your answer as much as possible.

$$[x(3x-4)]$$

(expand)

( $-xy$ )

( $\div 2y$ )

$$y(3x-4) = xy + 2$$

$$3xy - 4y = xy + 2$$

$$2xy - 4y = 2$$

$$2xy = 2 + 4y$$

$$x = \frac{2 + 4y}{2y}$$

Answer  $x = \dots\dots\dots$

$$x = \frac{1 + 2y}{y}$$

$$[x(3x-4)]$$

(expand)

( $-xy$ )

( $\div 2y$ )

Simplified.

(Total 4 marks)

7. Rearrange the formula  $3y + 2 = \frac{x+3}{x}$  to make  $x$  the subject.

$$\begin{array}{lll}
 (x \ x) & x(3y+2) = x+3 & (x \ x) \\
 (\text{expand}) & 3xy+2x = x+3 & (\text{expand}) \\
 (-x) & 3xy+x = 3 & (-x) \\
 (\text{factorise}) & x(3y+1) = 3 & (\text{factorise}) \\
 \left[ \div (3y+1) \right] & x = \frac{3}{3y+1} & \left[ \div (3y+1) \right]
 \end{array}$$

Answer .....

(Total 4 marks)

8. The time taken for a pendulum of length  $l$  to make one full swing is given by the formula:

$$T = 2\pi \sqrt{\frac{l}{g}}$$

where  $g$  is the acceleration due to gravity.

Rearrange this formula to make the subject  $l$ .

$$\begin{array}{lll}
 (\div 2\pi) & \frac{T}{2\pi} = \sqrt{\frac{l}{g}} & (\div 2\pi) \\
 (\text{Square}) & \left(\frac{T}{2\pi}\right)^2 = \frac{l}{g} & (\text{square}) \\
 (\times g) & \underline{\underline{l = g \left(\frac{T}{2\pi}\right)^2}} & (\times g) \\
 & \text{or } \underline{\underline{l = \frac{g T^2}{4\pi^2}}} & \text{if expanded}
 \end{array}$$