

(f)	$5(y - 2) = 3(4 - y)$ $5y - 10 = 12 - 3y$ $5y - 10 + 10 = 12 + 10 - 3y$ $5y = 22 - 3y$ $5y + 3y = 22 - 3y + 3y$ $8y = 22$ $\frac{8^1 y}{8^1} = \frac{22^{11}}{8^4}$ $y = \frac{11}{4} = 2\frac{3}{4}$	or	$5(y - 2) = 3(4 - y)$ $5y - 10 = 12 - 3y$ $5y = 12 + 10 - 3y$ $5y = 22 - 3y$ $5y + 3y = 22$ $8y = 22$ $y = \frac{22}{8} = 2\frac{6}{8} = 2\frac{3}{4}$
(g)	$0.6(3y - 1) = 0.4y - 1$ $1.8y - 0.6 = 0.4y - 1$ $1.8y - 0.6 + 0.6 = 0.4y - 1 + 0.6$ $1.8y = 0.4y - 0.4$ $1.8y - 0.4y = 0.4y - 0.4y - 0.4$ $1.4y = -0.4$ $\frac{1.4y}{1.4} = \frac{-0.4}{1.4}$ $y = \frac{-0.4}{1.4} = \frac{-4}{14} = \frac{-2}{7}$	or	$0.6(3y - 1) = 0.4y - 1$ $1.8y - 0.6 = 0.4y - 1$ $1.8y = 0.4y - 1 + 0.6$ $1.8y = 0.4y - 0.4$ $1.8y - 0.4y = -0.4$ $1.4y = -0.4$ $y = \frac{-0.4}{1.4} = \frac{-4}{14} = \frac{-2}{7}$
(h)	$4 - 7a = 3(1 - 3a)$ $4 - 7a = 3 - 9a$ $4 - 4 - 7a = 3 - 4 - 9a$ $-7a = -1 - 9a$ $-7a + 9a = -1 - 9a + 9a$ $2a = -1$ $\frac{2a}{2} = \frac{-1}{2}$ $a = \frac{-1}{2}$	or	$4 - 7a = 3(1 - 3a)$ $4 - 7a = 3 - 9a$ $-7a = 3 - 4 - 9a$ $-7a = -1 - 9a$ $-7a + 9a = -1$ $2a = -1$ $a = \frac{-1}{2}$
(i)	$2 - (3x + 9) = 4(5 - 3x)$ $2 - 3x - 9 = 20 - 12x$ $-3x - 7 = 20 - 12x$ $-3x - 7 + 7 = 20 + 7 - 12x$ $-3x = 27 - 12x$ $-3x + 12x = 27 - 12x + 12x$ $9x = 27$ $\frac{9^1 x}{9^1} = \frac{27}{9}$ $x = 3$	or	$2 - (3x + 9) = 4(5 - 3x)$ $2 - 3x - 9 = 20 - 12x$ $-3x - 7 = 20 - 12x$ $-3x = 20 + 7 - 12x$ $-3x = 27 - 12x$ $-3x + 12x = 27$ $9x = 27$ $x = \frac{27}{9}$ $x = 3$

4. Transpose the following equations for the subject given in the brackets.

(a) $P = \frac{W}{t} \quad (W)$ or $P = \frac{W}{t} \quad (W)$
 $Pt = \frac{\cancel{t}^1 W}{\cancel{t}^1}$
 $Pt = W$

(b) $P = \frac{W}{t} \quad (t)$ or $P = \frac{W}{t} \quad (t)$
 $\frac{P}{1} = \frac{W}{t}$
 $\frac{1}{P} = \frac{t}{W}$
 $\frac{1 \times W}{P} = \frac{t \times \cancel{W}^1}{\cancel{W}^1}$
 $\frac{W}{P} = t$

(c) $A = l \times b \quad (l)$ or $A = l \times b \quad (l)$
 $\frac{A}{b} = \frac{l \times \cancel{b}^1}{\cancel{b}^1}$
 $\frac{A}{b} = l$

(d) $C = Vq + F \quad (q)$ or $C = Vq + F \quad (q)$
 $C - F = Vq + F - F$
 $C - F = Vq$
 $\frac{C - F}{V} = \frac{\cancel{V}^1 q}{\cancel{V}^1}$
 $\frac{C - F}{V} = q$

(e) $V = \frac{1}{3} \pi r^2 h \quad (h)$ or $V = \frac{1}{3} \pi r^2 h \quad (h)$
 $3 \times V = 3 \times \frac{1}{3} \pi r^2 h$
 $3V = \pi r^2 h$
 $\frac{3V}{\pi r^2} = \frac{\cancel{\pi r^2}^1 h}{\cancel{\pi r^2}^1}$
 $\frac{3V}{\pi r^2} = h$

$$(f) \quad V = \frac{1}{3}\pi r^2 h \quad (r)$$

$$3V = \pi r^2 h$$

$$\frac{3V}{\pi h} = \frac{\cancel{\pi}^1 r^2 \cancel{h}^1}{\cancel{\pi}^1 \cancel{h}^1}$$

$$\frac{3V}{\pi h} = r^2$$

$$\sqrt{\frac{3V}{\pi h}} = \sqrt{r^2}$$

$$\sqrt{\frac{3V}{\pi h}} = r$$

or

$$V = \frac{1}{3}\pi r^2 h \quad (r)$$

$$3V = \pi r^2 h$$

$$\frac{3V}{\pi h} = r^2$$

$$\sqrt{\frac{3V}{\pi h}} = r$$

$$(g) \quad R = \frac{l}{\mu a} \quad (l)$$

$$R \times \mu a = \frac{l \times \cancel{\mu a}^1}{\cancel{\mu a}^1}$$

$$R\mu a = l$$

or

$$R = \frac{l}{\mu a} \quad (l)$$

$$R\mu a = l$$

$$(h) \quad R = \frac{l}{\mu a} \quad (a)$$

$$R \times \mu a = \frac{l \times \cancel{\mu a}^1}{\cancel{\mu a}^1}$$

$$R\mu a = l$$

$$\frac{\cancel{R\mu}^1 a}{\cancel{R\mu}^1} = \frac{l}{R\mu}$$

$$a = \frac{l}{R\mu}$$

or

$$R = \frac{l}{\mu a} \quad (a)$$

$$R\mu a = l$$

$$a = \frac{l}{R\mu}$$

$$(i) \quad A = \frac{1}{2}bh \quad (b)$$

$$2 \times A = 2 \times \frac{1}{2}bh$$

$$2A = bh$$

$$\frac{2A}{h} = \frac{bh^1}{h^1}$$

$$\frac{2A}{h} = b$$

or

$$A = \frac{1}{2}bh \quad (b)$$

$$2A = bh$$

$$\frac{2A}{h} = b$$

$$(j) \quad C = 2\pi r \quad (r)$$

$$\frac{C}{2\pi} = \frac{2\pi r}{2\pi}$$

$$\frac{C}{2\pi} = r$$

or

$$C = 2\pi r \quad (r)$$

$$\frac{C}{2\pi} = r$$



(k)	$c^2 = a^2 + b^2 \quad (a)$ $c^2 - b^2 = a^2 + b^2 - b^2$ $c^2 - b^2 = a^2$ $\sqrt{c^2 - b^2} = \sqrt{a^2}$ $\sqrt{c^2 - b^2} = a$	or	$c^2 = a^2 + b^2 \quad (a)$ $c^2 - b^2 = a^2$ $\sqrt{c^2 - b^2} = a$
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(l)	$PV = nRT \quad (P)$ $\frac{P\cancel{V}^1}{\cancel{V}^1} = \frac{nRT}{V}$ $P = \frac{nRT}{V}$	or	$PV = nRT \quad (P)$ $P = \frac{nRT}{V}$
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(m)	$PV = nRT \quad (n)$ $\frac{PV}{RT} = \frac{n\cancel{RT}^1}{\cancel{RT}^1}$ $\frac{PV}{RT} = n$	or	$PV = nRT \quad (n)$ $\frac{PV}{RT} = n$
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(n)	$Q_1 = P(Q_2 - Q_1) \quad (P)$ $\frac{Q_1}{(Q_2 - Q_1)} = \frac{P\cancel{(Q_2 - Q_1)}^1}{\cancel{(Q_2 - Q_1)}^1}$ $\frac{Q_1}{(Q_2 - Q_1)} = P$	or	$Q_1 = P(Q_2 - Q_1) \quad (P)$ $\frac{Q_1}{(Q_2 - Q_1)} = P$
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(o)	$Q_1 = P(Q_2 - Q_1) \quad (Q_2)$ $Q_1 = PQ_2 - PQ_1$ $Q_1 + PQ_1 = PQ_2 - PQ_1 + PQ_1$ $Q_1 + PQ_1 = PQ_2$ $\frac{Q_1 + PQ_1}{P} = \frac{PQ_2}{P}$ $\frac{Q_1 + PQ_1}{P} = Q_2$	or	$Q_1 = P(Q_2 - Q_1) \quad (Q_2)$ $Q_1 = PQ_2 - PQ_1$ $Q_1 + PQ_1 = PQ_2$ $\frac{Q_1 + PQ_1}{P} = Q_2$
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(p)	$Q_1 = P(Q_2 - Q_1) \quad (Q_1)$ $Q_1 = PQ_2 - PQ_1$ $Q_1 + PQ_1 = PQ_2 - PQ_1 + PQ_1$ $Q_1 + PQ_1 = PQ_2$ $Q_1(1 + P) = PQ_2$ $\frac{Q_1(1 + P)}{(1 + P)} = \frac{PQ_2}{(1 + P)}$ $Q_1 = \frac{PQ_2}{(1 + P)}$	or	$Q_1 = P(Q_2 - Q_1) \quad (Q_1)$ $Q_1 = PQ_2 - PQ_1$ $Q_1 + PQ_1 = PQ_2$ $Q_1(1 + P) = PQ_2$ $Q_1 = \frac{PQ_2}{(1 + P)}$
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$$\begin{aligned}
 \text{(q)} \quad R_2 &= R_1(1 + \alpha t) \quad (t) \\
 R_2 &= R_1 + R_1\alpha t \\
 R_2 - R_1 &= R_1 - R_1 + R_1\alpha t \\
 R_2 - R_1 &= R_1\alpha t \\
 \frac{R_2 - R_1}{R_1\alpha} &= \frac{\cancel{R_1\alpha}^1 t}{\cancel{R_1\alpha}^1} \\
 \frac{R_2 - R_1}{R_1\alpha} &= t
 \end{aligned}$$

$$\begin{aligned}
 \text{or} \quad R_2 &= R_1(1 + \alpha t) \quad (t) \\
 R_2 &= R_1 + R_1\alpha t \\
 R_2 - R_1 &= R_1\alpha t \\
 \frac{R_2 - R_1}{R_1\alpha} &= t
 \end{aligned}$$

$$\begin{aligned}
 \text{(r)} \quad E &= mc^2 \quad (c) \\
 \frac{E}{m} &= \frac{\cancel{m}^1 c^2}{\cancel{m}^1} \\
 \frac{E}{m} &= c^2 \\
 \sqrt{\frac{E}{m}} &= \sqrt{c^2} \\
 \sqrt{\frac{E}{m}} &= c
 \end{aligned}$$

$$\begin{aligned}
 \text{or} \quad E &= mc^2 \quad (c) \\
 \frac{E}{m} &= c^2 \\
 \sqrt{\frac{E}{m}} &= c
 \end{aligned}$$

$$\begin{aligned}
 \text{(s)} \quad \frac{1}{f} &= \frac{1}{u} + \frac{1}{v} \quad (v) \\
 \frac{1}{f} - \frac{1}{u} &= \frac{1}{u} - \frac{1}{u} + \frac{1}{v} \\
 \frac{1}{f} - \frac{1}{u} &= \frac{1}{v} \\
 \frac{u - f}{fu} &= \frac{1}{v} \\
 \frac{v}{1} &= \frac{fu}{u - f} \\
 v &= \frac{fu}{u - f}
 \end{aligned}$$

$$\begin{aligned}
 \text{or} \quad \frac{1}{f} &= \frac{1}{u} + \frac{1}{v} \quad (v) \\
 \frac{1}{f} - \frac{1}{u} &= \frac{1}{v} \\
 \frac{u - f}{fu} &= \frac{1}{v} \\
 v &= \frac{fu}{u - f}
 \end{aligned}$$

$$\begin{aligned}
 \text{(t)} \quad T &= mg + m\omega^2 r \quad (r) \\
 T - mg &= mg - mg + m\omega^2 r \\
 T - mg &= m\omega^2 r \\
 \frac{T - mg}{m\omega^2} &= \frac{\cancel{m\omega^2}^1 r}{\cancel{m\omega^2}^1} \\
 \frac{T - mg}{m\omega^2} &= r
 \end{aligned}$$

$$\begin{aligned}
 \text{or} \quad T &= mg + m\omega^2 r \quad (r) \\
 T - mg &= m\omega^2 r \\
 \frac{T - mg}{m\omega^2} &= r
 \end{aligned}$$



(u)
$$P = \frac{V_1(V_2 - V_1)}{gJ} \quad (V_2)$$

or

$$P = \frac{V_1V_2 - (V_1)^2}{gJ}$$

$$P \times gJ = \frac{V_1V_2 - (V_1)^2}{\cancel{gJ}^1} \times \frac{\cancel{gJ}^1}{1}$$

$$PgJ = V_1V_2 - (V_1)^2$$

$$PgJ + (V_1)^2 = V_1V_2 - (V_1)^2 + (V_1)^2$$

$$PgJ + (V_1)^2 = V_1V_2$$

$$\frac{PgJ + (V_1)^2}{V_1} = \frac{V_1V_2}{V_1}$$

$$\frac{PgJ + (V_1)^2}{V_1} = V_2$$

(u)
$$P = \frac{V_1(V_2 - V_1)}{gJ} \quad (V_2)$$

$$P = \frac{V_1V_2 - (V_1)^2}{gJ}$$

$$PgJ = V_1V_2 - (V_1)^2$$

$$PgJ + (V_1)^2 = V_1V_2$$

$$\frac{PgJ + (V_1)^2}{V_1} = V_2$$

(v)
$$Z = \sqrt{R^2 + \left(\frac{1}{\omega C}\right)^2} \quad (\omega)$$

or

$$Z^2 = \left(\sqrt{R^2 + \left(\frac{1}{\omega C}\right)^2}\right)^2$$

$$Z^2 = R^2 + \left(\frac{1}{\omega C}\right)^2$$

$$Z^2 - R^2 = R^2 - R^2 + \left(\frac{1}{\omega C}\right)^2$$

$$Z^2 - R^2 = \left(\frac{1}{\omega C}\right)^2$$

$$\sqrt{Z^2 - R^2} = \sqrt{\left(\frac{1}{\omega C}\right)^2}$$

$$\sqrt{Z^2 - R^2} = \frac{1}{\omega C}$$

$$\omega \times \sqrt{Z^2 - R^2} = \frac{1 \times \omega^1}{\omega^1 C}$$

$$\omega \sqrt{Z^2 - R^2} = \frac{1}{C}$$

$$\frac{\omega \sqrt{Z^2 - R^2}}{\sqrt{Z^2 - R^2}} = \frac{1}{C \sqrt{Z^2 - R^2}}$$

$$\omega = \frac{1}{C \sqrt{Z^2 - R^2}}$$

(v)
$$Z = \sqrt{R^2 + \left(\frac{1}{\omega C}\right)^2} \quad (\omega)$$

$$Z^2 = R^2 + \left(\frac{1}{\omega C}\right)^2$$

$$Z^2 - R^2 = \left(\frac{1}{\omega C}\right)^2$$

$$\sqrt{Z^2 - R^2} = \frac{1}{\omega C}$$

$$\omega \sqrt{Z^2 - R^2} = \frac{1}{C}$$

$$\omega = \frac{1}{C \sqrt{Z^2 - R^2}}$$

