ET1.6: TRANSPOSITION WITH BRACKETS AND FRACTIONS

Examples

1. Transform the formula \( P = 2 (L - W) \) to make ‘W’ the subject.

\[
P = 2 (L - W)
\]

\[
\frac{P}{2} = L - W
\]

[\( \div \) both sides]

\[
\frac{P}{2} - L = -W
\]

[- L both sides]

\[
W = \frac{P}{2} + L
\]

[x (-1) both sides]

2. If \( \frac{2}{k} = \frac{j+1}{3} \) find ‘k’.

\[
\frac{2}{k} = \frac{j+1}{3}
\]

\[
k(j + 1) = 6
\]

[cross multiplying is useful for removing fractions]

\[
k = \frac{6}{j+1}
\]

[\( \div (j + 1) \)]

3. Rearrange the formula \( L = \frac{Mt - g}{b} \) to make ‘M’ the subject.

\[
L = \frac{Mt - g}{b}
\]

[the fraction bar acts as a bracket]

\[
L \times b = Mt - g
\]

\[
bL + g = Mt
\]

[\( + g \) both sides]

\[
\frac{bL + g}{t} = M
\]

[\( \div t \) both sides]

\[
M = \frac{bL + g}{t}
\]
4. Make ‘v’ the subject of \( E = mgh + \frac{1}{2}mv^2 \).

\[
E = mgh + \frac{1}{2}mv^2
\]

\[
E - mgh = \frac{1}{2}mv^2
\]

\[
2(E - mgh) = m\dot{v}^2
\]

\[
\frac{2}{m}(E - mgh) = \dot{v}^2
\]

\[
v = \sqrt[3]{\frac{2}{m}(E - mgh)}
\]

5. Transpose \( T = 2\pi \sqrt[3]{\frac{L}{G}} \) to make ‘L’ the subject.

\[
T = 2\pi \sqrt[3]{\frac{L}{G}}
\]

\[
\frac{T}{2\pi} = \sqrt[3]{\frac{L}{G}}
\]

\[
\left(\frac{T}{2\pi}\right)^3 = \frac{L}{G}
\]

\[
L = G\left(\frac{T}{2\pi}\right)^3
\]

Exercises

1. \( S = C(A + B) \). Find A.
2. \( V = \frac{Ah}{3} \). Find A.
3. \( A = \frac{h(a+b)}{2} \). Find a.
4. \( A = \frac{2B+C}{P} \). Find B.
5. \( A = \frac{2P(B-C)}{3} \). Find C.
6. \( I = \frac{Mr^2}{2} \). Find r.
7. \( H = k(1 - bt) \). Find b.
8. \( t = 2\pi \sqrt[3]{\frac{h+k}{g}} \). Find h.
9. \( \dot{v}^2 = u^2 + 2as \). Find u.
10. \( m = \sqrt{\frac{x+y}{z}} \). Find y.

Answers (NB: There may be equivalent forms of the correct answer)
1. \( A = \frac{S}{C} - B \)
2. \( A = \frac{3N}{h} \)
3. \( a = \frac{2A}{h} - b \)
4. \( B = \frac{AP-C}{2} \)
5. \( C = B - \frac{3A}{2P} \)
6. \( r = \sqrt[3]{\frac{1}{w}} \)
7. \( b = \frac{k-H}{kt} \)
8. \( h = \frac{r_i}{4\sigma_1} - k \)
9. \( u = \pm\sqrt{\dot{v}^2 - 2as} \)
10. \( y = m^2z - x \)