Learning
Development

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FORMULAE

A **FORMULA** is an equation which gives a relationship between two or more quantities.

e.g.   c = hd

gives a formula for c in terms of h and d. c is the subject of the formula.
The value of c may be found by simple arithmetic after substituting the given values of h and d.

Example 1

If R = CA
Find R, if C = 6 and A = 2
R = C x A
Substituting the numbers for the letters we get:
R = 6 x 2
R = 12

Example 2

If v = u + at
Find v, if u = 10, a = 2, t = 6
v = u + (a x t)
Substituting the numbers for the letters we get:
v = 10 + (2 x 6)
v = 10 + 12
v = 12

Example 3

If $I = \dfrac{PRT}{100}$

find I, if P = 500, R = 3, T = 2

$I = \dfrac{P \times R \times T}{100}$

Substituting the numbers for letters we get:

$I = \dfrac{500 \times 3 \times 2}{100}$ cancel where possible

I = 30

Example 4

If $W = \dfrac{kz^2}{3}$

find W, when k = 9 and z = 5

$W = \dfrac{k \times z \times z}{3}$

Substituting the numbers for letters we get:

$W = \dfrac{9 \times 5 \times 5}{3}$

$W = 75$

Example 5

If C = 30(R − 2)
Find C, when R = 6
Substituting the numbers for letters we get:
C = 30(6 − 2)   **Remember to work out the brackets first!**
C = 30 x 4
C = 120

Example 6

Find R from the formula P = RT, when P = 20 and T = 4
Substituting the numbers for letters we get:
20 = R x 4
which is more neatly written
20 = 4R

$\dfrac{20}{4} = R$

(see Linear Equation Unit)
5 = R

Example 7

Find a from the formula S = Ta + b, when S = 60, b = 12 and T = 8.
Substituting number for letters:
60 = 8a + 12
60 − 12 = 8a
48 = 8a

$\dfrac{48}{8} = a$

6 = a

Example 8

Find a from the formula S = Ta +b, when S = 60, b = 12 and T = 8.
Substituting numbers for letters we get:

$$80 = c \times 4 \times 5$$
$$80 = 20 \times c$$

$$\frac{80}{20} = x$$

$$4 = c$$

Example 9

If C = 2(R – 6) find R when C = 24
Substituting the numbers for letters:

$$24 = 2(R – 6)$$

Multiply bracket out first!

$$24 = 2R – 12$$
$$24 + 12 = 2R$$
$$36 = 2R$$

$$\frac{36}{2} = R$$

$$18 = R$$

1. If J = ak, find J, when a = 15 and k = 3.

2. If P = r – st, find P, when r = 20, s = 2 and t = 3.

3. If I = $\frac{PRT}{100}$, find I, when P = 200, and R = 4 and T = 2.

4. If c = pz^2, find c, when p = 1 and z = 6.

5. If C = 20(z + 6), find C. when z = 2.

6. Find R from the formula, Z = RY, when Z = 40 and Y = 5.

7. Find A from the formula, J = BA + C, when JJ = 120, C = 12 and B = 8.

8. Find C from the formula, H = Cbn, when H = 100, b = 2 and n = 10.

9. If R = 3(p – 2), find R, when p = 9.

10. If C = $\frac{2j^2}{k}$, find C when j = 3 and k = 6.

ANSWERS

1. J = 3 x 15 = 45

2. P = 20 – (2 x 3)
    = 20 – 6
    = 14

3. I = $\frac{200 \times 4 \times 2}{100}$

    = 16

4. c = $\frac{1 \times 6 \times 6}{2}$

5. C = 20(2 + 6)
    = 20 x 8
    = 160

6. 40 = 5R
    $\frac{40}{5}$ = R

    8 = R

7. 120 = 8A + 12
    120 –12 = 8A
    108 = 8A
    $\frac{108}{8}$ = A

    13.5 = A

8. 100 = C x 2 x 10
    100 = 20C
    $\frac{100}{20}$ = C

    5 = C

9. R = 3(9 – 2)
    R = 3 x 7
    R = 21

10. C = $\frac{2 \times 3 \times 3}{6}$

    C = $\frac{18}{6}$

    C = 3