

Expressions & Formulae

1. Given that $a = 8$, $b = 12$ and $c = 4$, calculate the value of:

(a) $a - 2c$ (b) $c(b - a)$ (c) $\frac{2a + b}{c}$
(d) $a + \frac{b}{c}$ (e) $a^2 + c^2$ (f) $(2c)^2$

2. A formula is defined as $E = 5p + q^2$.

- (a) Calculate the value of E when $p = 2$ and $q = 3$.
(b) Calculate the value of E when $p = 4$ and $q = 2$.
(c) Calculate the value of E when $p = 5$ and $q = 8$.

3. (a) What is the value of $x^2 + 3x - 5$ when $x = 4$?
(b) What is the value of $x^2 - 2x + 7$ when $x = 3$?
(c) What is the value of $2x^2 + x - 1$ when $x = 2$?

4. Express each of the fractions below in their simplest form given that $a = 7$ and $b = 3$.

(a) $\frac{a-b}{a+b}$ (b) $\frac{a+b}{2a+2b}$ (c) $\frac{3b-a}{4b}$ (d) $\frac{4b-a}{4a-b}$

**** You need a calculator for questions 5 and 6.**



5. A formula is defined as $P = d^2 - \frac{e}{17}$.

Calculate, giving your answers correct to 3 significant figures, the value of P when:

- (a) $d = 13$ and $e = 130$ (b) $d = 11$ and $e = 64$ (c) $d = 21$ and $e = 200$
(d) $d = 4$ and $e = 60$ (e) $d = 3$ and $e = 32$ (f) $d = 21.5$ and $e = 5950$

6. Given that $h = 15$ and $g = 23$, calculate, correct to 2 significant figures, the values of:

(a) $\frac{h+g}{h}$ (b) $\frac{h^2}{g}$ (c) $g(2h+g)$ (d) $\sqrt{\frac{h^2+g^2}{30}}$

Formula (1)

1. Evaluate the following formulae for the values given:

(a) $T = 3s + 2$, find T when $s = 18$

(b) $P = 5q - 7$, find P when $q = 3$

(c) $R = 40 - 8x$, find R when $x = 2.5$

(d) $z = 3 + 5y$, find z when $y = 1.8$

(e) $k = 2a + 3b$, find k when $a = 7, b = 2$

(f) $R = C + Pt$, find R when $C = 0.6, P = 2.4, t = 7$

(g) $P = kT - 0.8$, find P when $k = 4, T = 1.7$

(h) $Y = 1.9 + sZ$, find Y when $s = 2.8, Z = 0.5$

2. The following formulae are used in mathematics and science.

Evaluate each formula for the numbers given:

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

Find V when $\pi = 3.14, r = 9, h = 35$.

(b) $R = \frac{V}{I}$

Find R when $I = 5$ and $V = 0.1$.

(c) $v = f\lambda$

Find v when $f = 18$ and $\lambda = 2.5$.

(d) $E = mgh$

Find E when $m = 70, g = 10$ and $h = 2$.

(e) $A = \pi rs$

Find A when $\pi = 3.14, r = 2.5$ and $s = 12$.

(f) $v = u + at$

Find v when $u = 18, a = 6$ and $t = 9$.

(g) $s = ut + \frac{1}{2} at^2$

Find s when $a = 0.2, t = 90$ and $u = 0$.

(h) $A = 2\pi rh$

Find A when $\pi = 3.14, r = 24$ and $h = 50$.

(i) $P = I^2 r$

Find P when $I = 5, r = 15$.

(j) $A = \pi(R^2 - r^2)$

Find A when $\pi = 3.14, R = 20$ and $r = 8$.

(k) $e = \frac{1}{2} mv^2$

Find e when $m = 2$ and $v = 16$.

(l) $h = \frac{AVt}{mT}$

Find h when $A = 6, m = 0.8, V = 12, t = 60, T = 20$.

(m) $F = \frac{mv - mu}{t}$

Find F when $m = 2, u = 4, v = 7$ and $t = 3$.

(n) $s = \frac{v^2 - u^2}{2a}$

Find s when $a = \frac{1}{2}, u = 3$ and $v = 5$.

(o) $a = \sqrt{b^2 - c^2}$

Find a when $b = 31.2$ and $c = 12$.

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1. (a) 0 (b) 16 (c) 7
(d) 11 (e) 80 (f) 64
2. (a) $E = 19$ (b) $E = 24$ (c) $E = 89$
3. (a) 23 (b) 10 (c) 9
4. (a) $\frac{2}{5}$ (b) $\frac{1}{2}$ (c) $\frac{1}{6}$ (d) $\frac{1}{5}$
5. (a) $P = 161$ (b) $P = 117$ (c) $P = 429$
(d) $P = 12 \cdot 5$ (e) $P = 7 \cdot 12$ (f) $P = 112$
6. (a) $2 \cdot 5$ (b) $9 \cdot 8$ (c) 1200 (d) $5 \cdot 0$

Formula (1)

1. (a) $T = 56$ (b) $P = 8$ (c) $R = 20$ (d) $z = 12$
(e) $k = 20$ (f) $R = 17 \cdot 4$ (g) $P = 6$ (h) $y = 3 \cdot 3$
2. (a) $V = 2967 \cdot 3$ (b) $R = 0 \cdot 02$ (c) $v = 45$ (d) $E = 1400$
(e) $A = 94 \cdot 2$ (f) $v = 72$ (g) $s = 810$ (h) $A = 7536$
(i) $P = 375$ (j) $A = 1055 \cdot 04$ (k) $e = 256$ (l) $h = 270$
(m) $F = 2$ (n) $s = 16$ (o) $a = 28 \cdot 8$