

- 1 Find the sum and product of 7, 11 and 91.
- 2 Simplify (a) $9 - (-18)$, (b) $11 - (-11)$, (c) $-3 - 14$, (d) $(-3)(-14)$.
- 3 Find the value of $5(8 + 3) - 2(-3 - 6)$.
- 4 Find the value of $\frac{9!}{4!}$.
- 5 Reduce each of the following fractions to its simplest form:
(a) $\frac{4}{13}$ (b) $\frac{15}{20}$ (c) $\frac{15}{35}$ (d) $\frac{11}{12}$
- 6 Add $\frac{2}{7}$ and $\frac{1}{5}$ without using a calculator.
- 7 Find $\frac{3}{8} \times \frac{5}{7}$ without using a calculator.
- 8 Find $\frac{8}{5}$ of 120.
- 9 Simplify, if possible,
(a) $(9x)(-3y)$ (b) $9(4x + 5x)$
(c) $-2x + 11x$ (d) $(-2x)(11x)$
(e) $3x - 2y + 4z - 2x - 3y + 9z$
(f) $(8m)(-3q)$ (g) $8m(-3q)$ (h) $8m - 3q$
(i) $8(m - 3q)$ (j) $12x \div 3$ (k) $\frac{8ab^2d}{4abc}$
(l) $x - x$ (m) $(x)(-x)$ (n) $x(-x)$
(o) $-x(x)$
- 10 Remove the brackets from the following expressions and simplify the result if possible:
(a) $7(x + 2y) + 8(2x - y)$
(b) $7(p + q) - 6(p + q)$
(c) $2(x + y) + 3(x + 2y)$
- 11 Write down the reciprocal of
(a) 18 (b) $\frac{1}{11}$ (c) $\frac{3}{8}$ (d) $\frac{2x}{3y}$
- 12 Simplify (a) $x^2 \cdot x^5 \cdot x^9$, (b) $\frac{x^9}{x^4}$, (c) $\frac{x^4}{x^5}$.
- 13 If $V = Ah$ find the value of V when $A = 3$ and $h = 26$.
- 14 Factorise (a) $16x^2 - 4x$, (b) $11y + 121$, (c) $ax^2 - bx$, (d) $c^2 - 2cs$, (e) $s^2 - 2cs$.
- 15 Remove the brackets from the following and simplify the result:
(a) $(a + 3)(a - 5)$ (b) $(2b + 6)(b - 7)$
(c) $(3c + 4)(2c - 1)$ (d) $(5d + 8)(-2d - 1)$
- 16 Factorise (a) $2x^2 - 11x + 5$, (b) $2x^2 + 13x + 15$.
- 17 Simplify (a) $\frac{x}{4} + \frac{x}{5}$, (b) $\frac{x}{4} + \frac{x}{5} + \frac{x}{6}$.
- 18 Simplify (a) $\frac{2}{x} - \frac{3}{2x}$, (b) $\frac{2}{x} + \frac{3}{2x}$, (c) $\frac{2}{x} \times \frac{3}{2x}$.
- 19 Transpose each of the following formulae to make the given variable subject:
(a) $x = \frac{c}{y}$, for y
(b) $x = \frac{c}{y}$, for c
(c) $k = \frac{2n + 5}{n + 3}$, for n
(d) $T = 2\pi \sqrt{\frac{R - L}{g}}$, for R
- 20 Simplify each of the following:
(a) $\frac{m^{-7}}{m^{-4}}$ (b) $(3ab^2c)^3$
(c) $y^3 \times y^{-2} \times x^7 \times x^5 \times x^{-3}$
- 21 Write down the reciprocal of the following:
(a) $\frac{1}{3} + \frac{1}{2}$ (b) $\frac{x + y}{13}$ (c) $\frac{2R + 1}{R - 1}$ (d) 4!
- 22 Simplify $\frac{2x - 5}{10} - \frac{3x - 2}{15}$.
- 23 Simplify $\frac{3}{2x - 5} \div \frac{4}{x - 3}$.
- 24 Without using a calculator find the value of
 $3 \frac{13}{17} + \frac{4 - \frac{1}{3}}{3/7}$
- 25 Express as a single fraction
 $\frac{u}{(u - v)(u - w)} + \frac{v}{(u - v)(u - w)} + \frac{w}{u - v}$
- 26 Simplify
 $\frac{\frac{5}{x} - \frac{2}{x^2}}{x + 1}$
- 27 Express the following using single powers:
(a) $\frac{4^{1/3} 4^8}{4^{-1/2}}$ (b) $\sqrt{y} \sqrt[3]{y} \sqrt[4]{y}$
- 28 Simplify $\frac{A}{2z} \frac{1}{s - \omega} - \frac{A}{2z} \frac{1}{s + \omega}$.
- 29 Factorise $\frac{A}{t_0 s} - \frac{A}{t_0 s^2}$.
- 30 Remove the brackets from
 $\frac{1}{\omega} \left[\frac{s\omega}{s^2 + \omega^2} - s \right]$
- 31 Express as a single fraction
 $\frac{a_1}{s + p_1} + \frac{a_2}{s + p_2}$
- 32 Express as a single fraction
 $s + 2 + \frac{s + 3}{(s + 1)(s + 2)}$
- 33 Express as a single fraction
 $\frac{1}{\omega^2 s} - \frac{s}{\omega^2 (s^2 + \omega^2)}$
- 34 By multiplying both numerator and denominator of $\frac{1}{a + b\sqrt{c}}$ by $a - b\sqrt{c}$ show that
 $\frac{1}{a + b\sqrt{c}} = \frac{a - b\sqrt{c}}{a^2 - b^2c}$
Use this approach to show that
 $\frac{1}{2 + \sqrt{3}} = 2 - \sqrt{3}$