

- The star nearest the Earth is approximately 41 600 000 000 000 kilometres away. Express this distance in scientific notation.
- A micron is one-millionth of a metre. Write 3 microns as a decimal of a metre in standard form.
- Evaluate the following and give your answers in scientific notation, correct to 3 significant figures:
 - $(7.16 \times 10^3) \div (4.94 \times 10^8)$
 - $\frac{600}{\frac{4}{3}\pi}$
 - $\sqrt{\frac{34.9 - 16.92}{8.36 + 1.99}}$
 - $\frac{5}{9} \times 17.42 - \frac{3}{7} \times 13.81$
- Evaluate the following:
 - $|5 - 17|$
 - $|7 - 13| + 6$
 - $|-3| + |-5| - 2|-1|$
- Expand and simplify:
 - $2a - c - (7c + 21a) - 2(20a + 8c)$
 - $(2b + 4)(b - 2)$
 - $(3m - 2n)(3m + 2n)$
 - $(2x - 4)^2$
 - $(a + 1)(a^2 + 3a + 3)$
 - $(x - y)^3$
- The formula $A = 180 - \frac{360}{n}$ can be used to find the size, A degrees, of each angle in a regular polygon of n sides. Find the size of each angle of a regular:
 - pentagon
 - undecagon
- Simplify the following:
 - $\sqrt{180} + \sqrt{28} - 2\sqrt{5}$
 - $(2\sqrt{7} + 1)^2$
 - $(3\sqrt{5} - 2\sqrt{2})(2\sqrt{5} + 3\sqrt{2})$
- Simplify the following by rationalising the denominator in each case:
 - $\frac{4}{3\sqrt{7}}$
 - $\frac{\sqrt{2} + 1}{\sqrt{3}}$
 - $\frac{1}{\sqrt{3} - \sqrt{2}}$
 - $\frac{3 + 2\sqrt{5}}{2\sqrt{5} - 1}$
- Factorise:
 - $5a^3 - 25a^2B$
 - $2a^3 - a^2 - 10a + 5$
 - $64 - 26m^2$
 - $x^2 - 2x - 63$
 - $6x^2 - 7x - 3$
 - $16x^4 - y^4$
 - $5m^3 - 5$
 - $4t^3 + 500$
- Simplify the following algebraic expressions:
 - $\frac{3x^3 + 24}{12 - 3x^2}$
 - $\frac{16x}{5} \times \frac{25y}{8x}$
 - $\frac{x^2 - x - 20}{x^2 - 25} \div \frac{x + 1}{x^2 + 5x}$
 - $\frac{x + 1}{4} + \frac{2x}{5}$
 - $\frac{3}{a + 4} + \frac{2}{a - 1}$
 - $\frac{5c}{a^2 + ab} - \frac{c}{a + b}$
 - $\frac{x^2}{x^2 + 3x + 2} - \frac{2x}{x + 2}$
- Solve:
 - $5(a - 3) = 2(a + 6)$
 - $\frac{x + 4}{2} = \frac{2x - 3}{3}$
 - $\frac{6}{x} + 2 = 3x + 9$
- Given that $S = \frac{n}{2}(a + l)$, find n when $S = 1518$, $a = 4$ and $l = 62$.
- Solve the following equations involving absolute values:
 - $|2x - 3| = 17$
 - $|2x + 1| = |x - 2|$
 - $|2x + 5| = 3x + 9$
- Solve the following quadratic equations using the method indicated:
 - $3x^2 + 2x - 5 = 0$ (by factorisation)
 - $x^2 = 4x + 3$ (by completing the square)
 - $6x^2 + 5x = 6$ (using the quadratic formula and given answers in exact form)
- Solve the following simultaneous equations:
 - $\begin{cases} 2x + y = 8 \\ 3x + 2y = 13 \end{cases}$
 - $\begin{cases} x^2 - xy = 35 \\ x - y = 5 \end{cases}$
- Solve the following inequalities:
 - $5(x - 3) \leq 2(x + 7)$
 - $7 < 4x + 3 < 4$
 - $\frac{2}{x - 4} > \frac{1}{3}$
 - $|4x + 3| > 19$
 - $|7x - 3| \leq 4$
- Given that: $\frac{3\sqrt{2} - 2\sqrt{3}}{3\sqrt{2} + 2\sqrt{3}} = a + b\sqrt{6}$, find the values of a and b .
- Express the following in the simplest form possible, without the use of negative indices:
 - $\frac{a^{-1} + b^{-1}}{a + b}$
 - $(8x^6)^{\frac{1}{3}} x^{-3}$