D Michaelmas Intro Sheet

A selection of questions based on material you covered last year.

1. Solve $\frac{2x-1}{3} - \frac{x-4}{2} = x + 3$. $\boxed{x = -\frac{8}{5}}$
2. Make x the subject in $\frac{3x+a}{bx-6} = c$. $\boxed{x = \frac{a+6c}{bc-3}}$
3. Evaluate $\left(\frac{4}{9}\right)^{-\frac{3}{2}}$. $\boxed{\frac{27}{8}}$
4. A cone has volume 100π. Its base has radius 5. Find its *slant height*. $\boxed{13}$
5. Factorise fully $8x^3 + 8x^2 - 6x$. $\boxed{2x(2x+3)(2x-1)}$
6. Simplify $\frac{2x+3}{2x+1}$. $\boxed{\frac{2x+3}{2x+1}}$
7. Combine the following into a fully simplified single term: $\frac{2}{(x+1)^2} - \frac{3}{(x+1)^3}$. $\boxed{\frac{2x-1}{(x+1)^3}}$
8. P varies inversely with t. When $P = 7$, $t = 4$. Find P when $t = 50$. $\boxed{\frac{14}{25}}$
9. Solve $8x + \frac{2}{x} = 17$. $\boxed{x = 2 \text{ or } x = \frac{1}{8}}$
10. In triangle ABC, $AB = 7$, $BC = 8$, $AC = 9$.
    (a) Find the largest angle in the triangle. $\boxed{73.4}$
    (b) Find the area of the triangle. [Brownie points for anyone who can do it without using any trigonometry.] $\boxed{26.8}$
11. Prove that the opposite angles in a cyclic quadrilateral sum to 180°.
12. Factorise $2x^3 - 2$. $\boxed{2(x-1)(x^2+x+1)}$