1. Surds

1. Given that $Tan\theta = \frac{1}{\sqrt{5}}$ and θ is an acute angle, find without using tables or calculators, Sin (90 - θ), leaving your answer in simplified surd form. (2mks)

2. Given that $\sqrt{3} = 1.7321$, express in surd form, rationalize the denominator and then find the value of the expression below to 5 significant figures without using the calculator. (3mks)

$$\frac{2 - \tan 60^0}{3 - 2\cos 30^0}$$

3. Simplify $(1+\sqrt{3})(1-\sqrt{3})$ and hence evaluate $\frac{1}{1+\sqrt{3}}$ to 3 significant figures given that $\sqrt{3} = 1.7321$. (3mks)

4. Without using mathematical tables or calculators, find the volume of a container whose base is a regular hexagon of side $\sqrt{3}$ cm and height $2\sqrt{3}$ cm (4 mks)

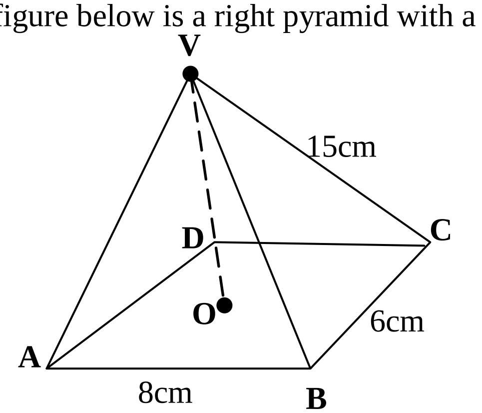
5. Simplify; $\frac{3}{\sqrt{7}-2} + \frac{1}{\sqrt{7}}$ leaving the answer in the form **a + b√c** , where **a, b** and **c** are rational numbers

6. Given that:- $\frac{2+\sqrt{5}}{2-\sqrt{5}} - \frac{3+\sqrt{5}}{2+\sqrt{5}} = a + b\sqrt{5}$
Find the values of **a** and **b** where **a** and **b** are rational numbers

7. If:- $\frac{\sqrt{14}}{\sqrt{7}-\sqrt{12}} - \frac{\sqrt{14}}{\sqrt{7}+\sqrt{2}} = a\sqrt{7} + b\sqrt{2}$ Find the values of **a** and **b**, where **a** and **b** are rational numbers *

8. Rationalize the denominator $\frac{2-\sqrt{2}}{(\sqrt{2}-1)^3}$ and express your answer in the form of **a + c 2**

9. The figure below is a right pyramid with a rectangular base ABCD and vertex V.



O is the centre of the base and M is a point on OV such that OM = $^1/_3$ OV, AB = 8 cm, BC = 6 cm and VA = VB=VD = VC = 15 cm. Find ;
i) The height OV of the pyramid.
ii) The angle between the plane BMC and base ABCD.

10. Find the value of **y** which satisfies the equation
$$\log_{10} 5 - 2 + \log_{10}(2y + 10) = \log_{10}(y - 4)$$

11. Simplify the expression $\frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}}$ giving your answer in the for of a + b $\sqrt{c}$.