

2500/406

NATIONAL
QUALIFICATIONS
2005FRIDAY, 6 MAY
2.45 PM – 4.05 PMMATHEMATICS
STANDARD GRADE
Credit Level
Paper 2

- 1 You may use a calculator.
- 2 Answer as many questions as you can.
- 3 Full credit will be given only where the solution contains appropriate working.
- 4 Square-ruled paper is provided.



FORMULAE LIST

The roots of $ax^2 + bx + c = 0$ are $x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$

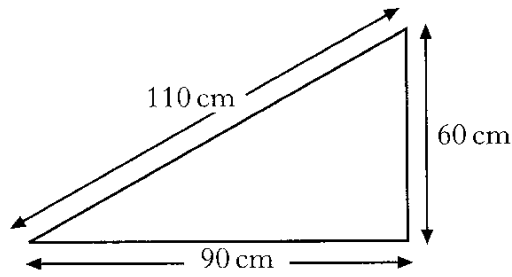
Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule: $a^2 = b^2 + c^2 - 2bc \cos A$ or $\cos A = \frac{b^2 + c^2 - a^2}{2bc}$

Area of a triangle: Area = $\frac{1}{2}ab \sin C$

Standard deviation: $s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}} = \sqrt{\frac{\sum x^2 - (\sum x)^2/n}{n-1}}$, where n is the sample size.

5. A triangular paving slab has measurements as shown.



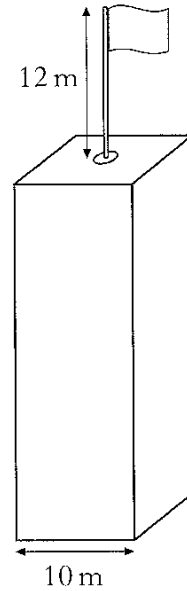
Is the slab in the shape of a right angled triangle?

Show your working.

3

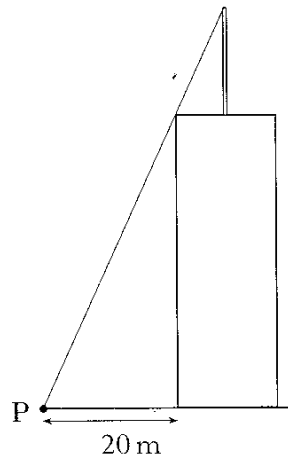
6. A vertical flagpole 12 metres high stands at the centre of the roof of a tower.

The tower is cuboid shaped with a square base of side 10 metres.



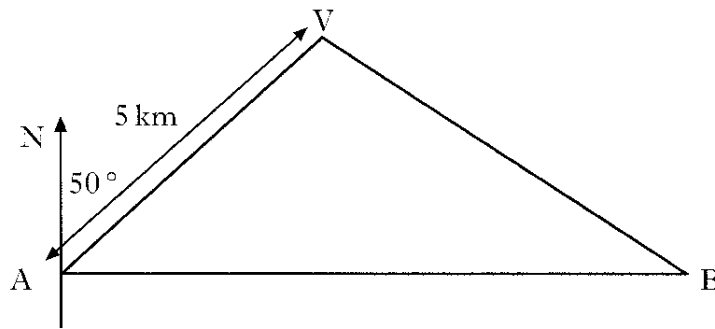
At a point P on the ground, 20 metres from the base of the tower, the top of the flagpole is just visible, as shown.

Calculate the height of the tower.



4

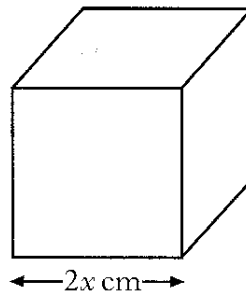
7. David walks on a bearing of 050° from hostel A to a viewpoint V, 5 kilometres away.
 Hostel B is due east of hostel A.
 Susie walks on a bearing of 294° from hostel B to the same viewpoint.



Calculate the length of AB, the distance between the two hostels.

5

8. The side length of a cube is $2x$ centimetres.



The expression for the volume in cubic centimetres is equal to the expression for the surface area in square centimetres.

Calculate the side length of the cube.

5

[Turn over

11. (a) Solve algebraically the equation

$$\sqrt{3}\sin x^\circ - 1 = 0 \quad 0 \leq x < 360.$$

(b) Hence write down the solution of the equation

$$\sqrt{3}\sin 2x^\circ - 1 = 0 \quad 0 \leq x < 90.$$

[END OF QUESTION PAPER]

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