

ELGIN ACADEMY

Prelim Examination 2008 / 09

<p>MATHEMATICS National Qualifications - Intermediate 2 Maths 1, 2 and 3 Paper 1 (non-calculator)</p>

Time allowed - 45 minutes

Read carefully

1. You may **NOT** use a calculator.
2. Full credit will be given only where the solution contains appropriate working.
3. 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: $\text{Area} = \frac{1}{2} ab \sin C$

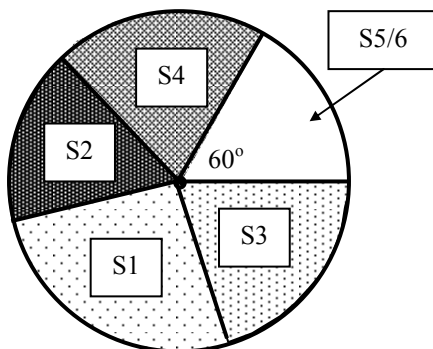
Volume of a sphere: $\text{Volume} = \frac{4}{3} \pi r^3$

Volume of a cone: $\text{Volume} = \frac{1}{3} \pi r^2 h$

Volume of a cylinder: $\text{Volume} = \pi r^2 h$

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.

1. The number of pupils in each year group in a secondary school was recorded and this pie chart drawn.

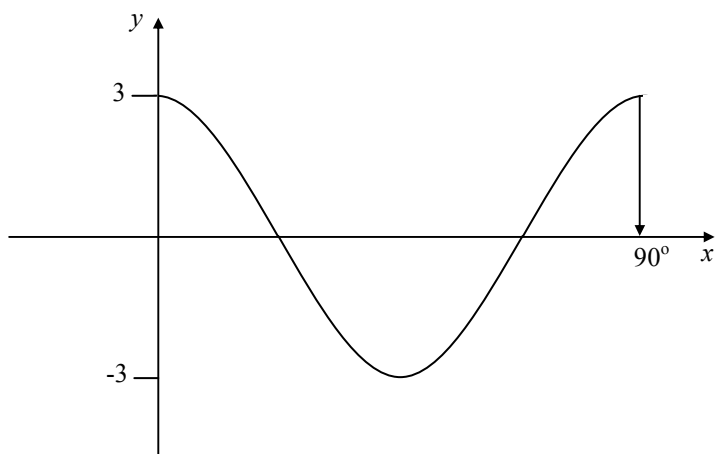


There are 1200 pupils in the school altogether with 240 in S3.

- (a) Calculate the size of the angle for third year. [2]
- (b) How many pupils were there in S5/6? [2]
2. Multiply out the brackets and simplify

$$5x^2 - 2x(3x - 5) - 6x \quad [3]$$

3. The graph in the diagram has equation of the form $y = a \cos bx$.



Write down the values of a and b . [2]

4. The data shows the length of films on TV during one weekend in July.

145	120	110	105	130
105	100	95	100	105
100	115	90	115	100

Show this information in a box-plot.

[4]

5. (a) Factorise $9x^2 - 4y^2$

[1]

- (b) Hence, simplify $\frac{9x^2 - 4y^2}{6x - 4y}$

[2]

6. A straight line has equation $2y + 3x = 8$. Which line of the table gives its gradient and y - intercept? Show working to explain your answer.

	Gradient	y - intercept
A	3	(0, 8)
B	-3	(0, 8)
C	$3/2$	(0, 4)
D	$-3/2$	(0, 4)

[2]

7. A coin is tossed and a die rolled together.

Which of these is the most likely outcome? (i) a head and an even number
OR (ii) a tail and a multiple of 3

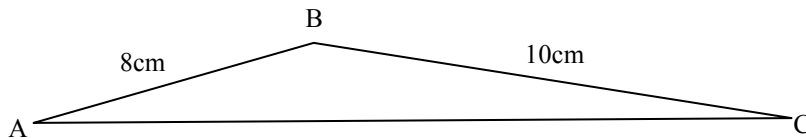
Give a reason for your answer.

[2]

8. Change the subject of the formula $a = b^2c + 7$ to 'b'.

[3]

9. Given that the area of this triangle is 20cm^2 , calculate the size of the obtuse angle ABC.



[4]

10. (a) Simplify $\frac{m^5}{m^{-3}}$ [1]
- (b) Evaluate $125^{-\frac{2}{3}}$ [2]

END OF QUESTION PAPER