

# ELGIN ACADEMY

*Prelim Examination 2008 / 09*

<p><b>MATHEMATICS</b> <b>National Qualifications - Intermediate 2</b> <b>Maths 1, 2 and Applications</b> <b>Paper 1 (non-calculator)</b></p>
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Time allowed - 45 minutes

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**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:  $\text{Area} = \frac{1}{2} ab \sin C$

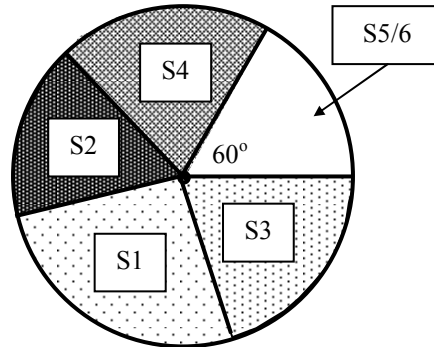
Volume of a sphere:  $\text{Volume} = \frac{4}{3} \pi r^3$

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. Joseph takes out a loan of £1200 that he wants to repay over 8 months. He finds that the loan is going to cost him £312 to do this.

- (a) Calculate his monthly repayment. [4]

Joseph decides to take out some loan protection which adds an extra 10% to his monthly payments.

- (b) Calculate his new monthly payment. [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. Factorise  $9x^2 - 4y^2$

[1]

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]

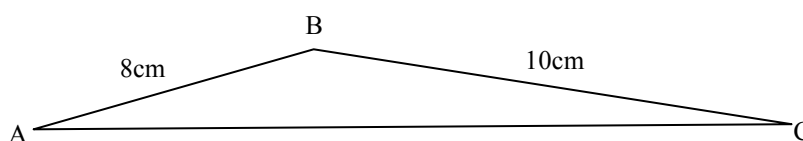
7. A coin is tossed and a die rolled together.

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.

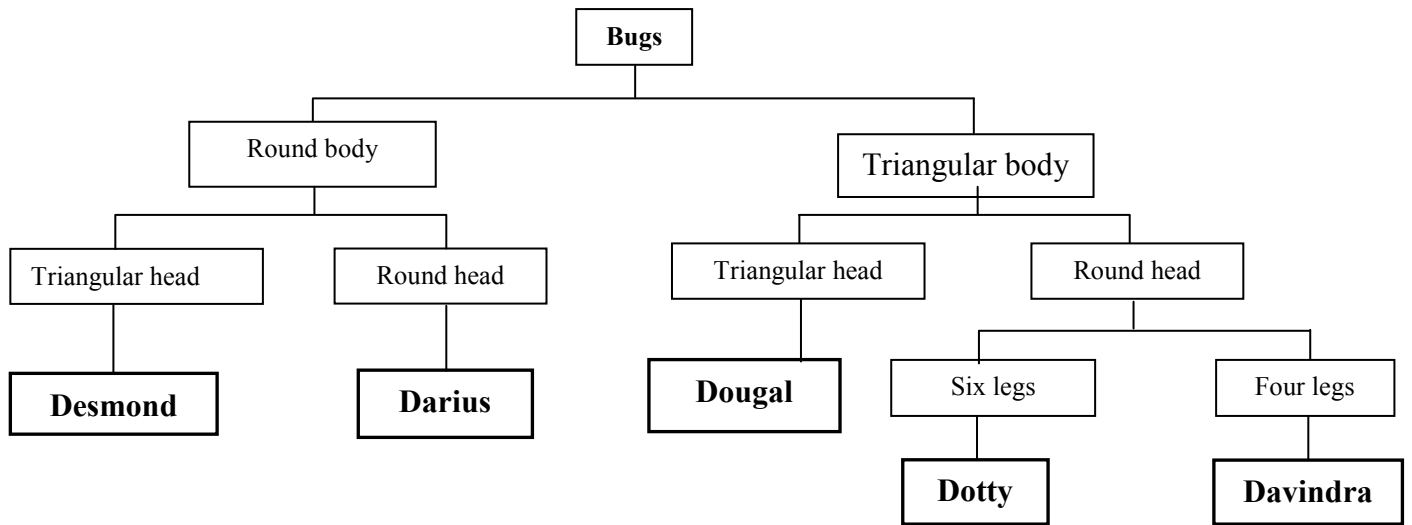
[2]

8. Given that the area of this triangle is  $20\text{cm}^2$ , calculate the size of the obtuse angle ABC.



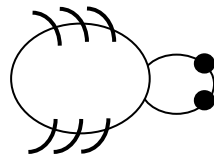
[4]

9. The tree diagram is used to classify 'bugs'.



Use the table to answer the following:

(a) Who is this?



[1]

(b) Make a drawing of Davindra.

[3]

***END OF QUESTION PAPER***