ELGIN ACADEMY

Prelim Examination 2005 / 06

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

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 $x = \dfrac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$

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

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

Area of a triangle: Area = ½ $ab \sin \mathrm{C}$

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

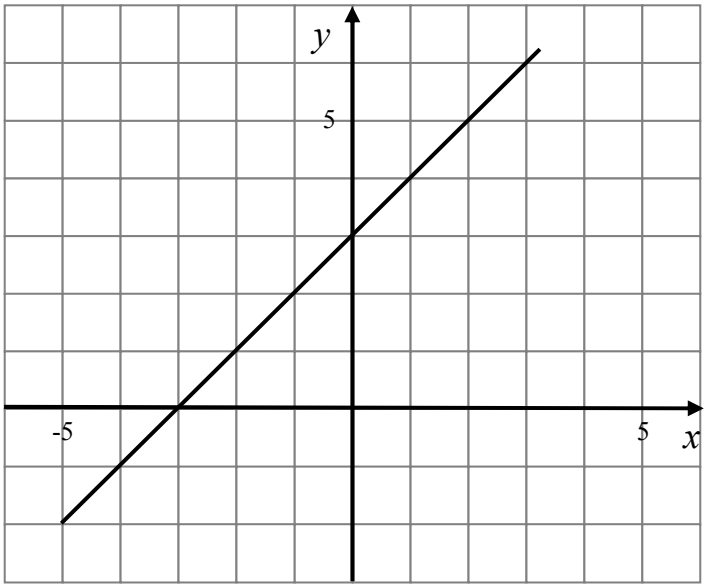
Volume of a cone: Volume = $\dfrac{1}{3}\pi r^2 h$

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

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

All questions should be attempted *Marks*

1. Write down the equation of the line shown in the diagram.



3

2. The number of missed hospital appointments over a period of 21 days were:

32	29	14	16	23	10	18
26	27	17	11	21	17	25
6	21	19	16	22	15	31

(a) Construct a stem-and-leaf diagram to illustrate this information. **3**

(b) Hence, or otherwise, write down the lower quartile, median and upper quartile of the data. **3**

(c) Calculate the semi-interquartile range. **2**

(d) Show this information on a box plot. **2**

3. In an electrical outlet, the following items were bought on Saturday.

Item:	Televisions	DVD Players	Computers	Radios
Frequency:	35	30	17	8

Calculate the relative frequency of each item **3**

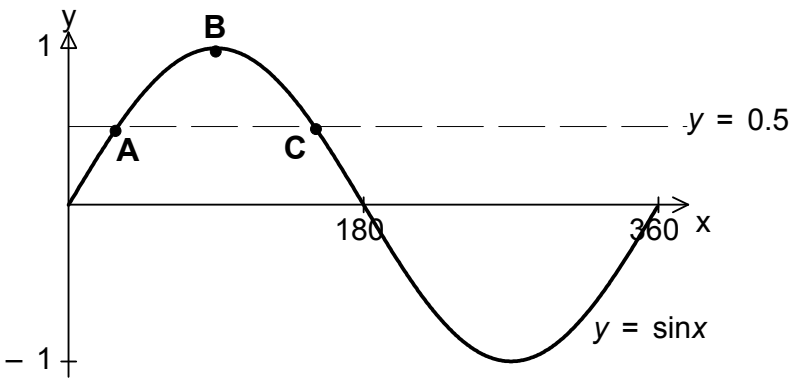
4. Simplify: $\dfrac{\sqrt{98}}{\sqrt{8}}$ **3**

5. **(a)** Multiply out $(3x+1)(x-2)$ **1**

(b) Hence or otherwise, simplify the following expression leaving your answer in fully factorised form.

$$4x^2-(3x+1)(x-2)-2x$$ **4**

6.



The diagram shows the graph of $y=\sin x$ for $0\le x\le 360$

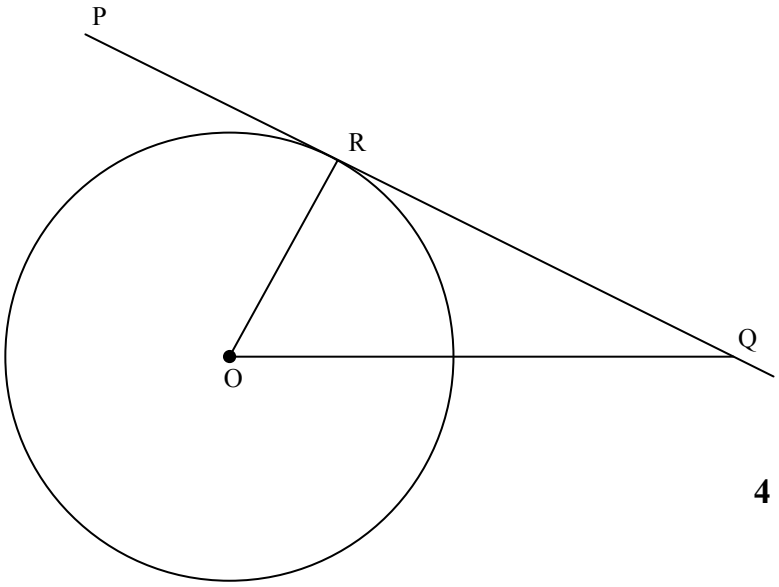
(a) Write down the co-ordinates of the point **B** **1**

(b) The straight line $y=0.5$ cuts the graph at **A** and **C**.
Find the co-ordinates of **A** and **C**. **3**

7. The circle in the diagram opposite has centre O and radius 6cm.

R is the point the point of contact of the tangent PQ.

Given that OQ = 10cm calculate the length of RQ.



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8. Simplify : $\dfrac{25-9y^2}{3y+5}$ **2**

END OF QUESTION PAPER