ELGIN ACADEMY

Prelim Examination 2005 / 2006

MATHEMATICS
Standard Grade - Credit Level

Paper I

Time allowed - 55 minutes

Read Carefully

1. Answer as many questions as you can.
2. Full credit will be given only where the solution contains appropriate working.
3. **You may not use a calculator**

FORMULAE LIST

The roots of $\mathbf{ax^2 + bx + c = 0}$ **are:** $x = \dfrac{-b \pm \sqrt{\left(b^2 - 4ac\right)}}{2a}$

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

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

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

Standard Deviation: $s = \sqrt{\dfrac{\sum(x - \bar{x})^2}{n - 1}} = \sqrt{\dfrac{\sum x^2 - \frac{(\sum x)^2}{n}}{n - 1}}$

	KU	RE

1. Evaluate: $8{\cdot}3 - 13{\cdot}5 \div 5$. **2**

2. Evaluate: $4\frac{5}{8} - 3\frac{2}{3}$. **2**

3. Change the subject of the formula: $W = \frac{7}{P} - 5$ to P. **3**

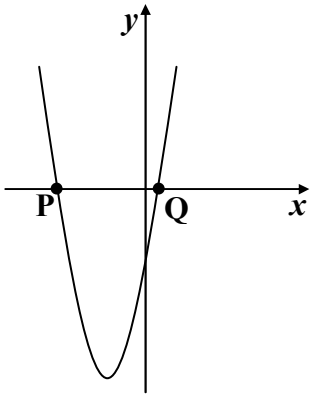
4. Solve the inequality: $3 - 4(3x - 4) \geq 3(2 - 3x)$ **4**

5. **(a)** Factorise: $4k^2 - 25$. **1**

(b) The graph in the diagram has equation

$$y = 2x^2 + 5x - 3$$

and cuts the x-axis at **P** and **Q**.



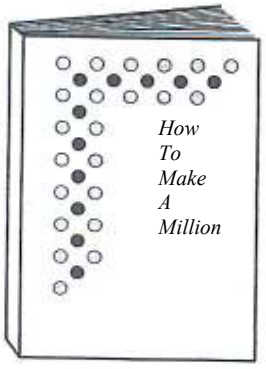
(i) Find the coordinates of the points **P** and **Q**. **3**

(ii) State the x-coordinate of the minimum point on the curve. **1**

6. Last year Megan bought the book shown opposite.

She sold it last week for £18 and made a 20% profit on the buying price.

How much did Megan pay for the book?

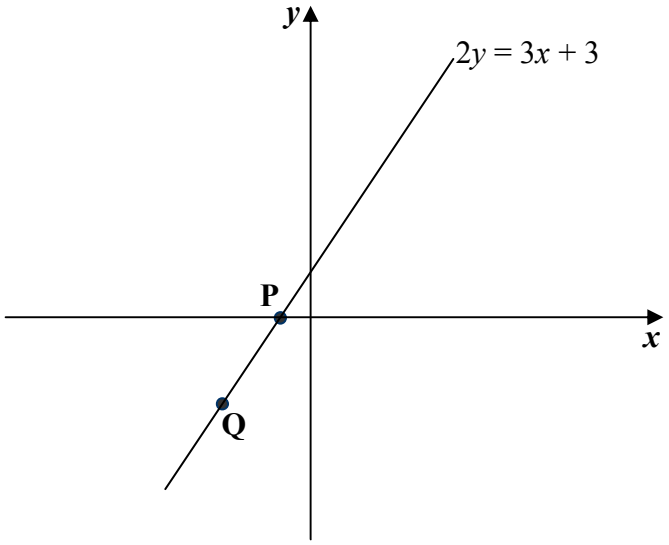


3

KU	RE

7. A function f is defined on the set of integers by the formula $f(x) = ax + b$ where a and b are integers.

Given that $f(1) = 2$ and $f(3) = 7$, find $f(4)$. **5**

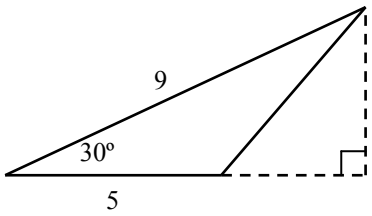
8. 

The diagram opposite shows the graph of the function $2y = 3x + 3$

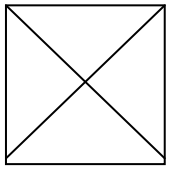
(a) Find the coordinates of **P**, the point where the line cuts the x-axis. **2**

(b) The point **Q**, shown on the line, is equidistant from the two axes. Find the coordinates of **Q**. **4**

9. Find the area of the given triangle. **3**



10. A polygon with x sides has $\frac{1}{2}x(x-3)$ diagonals.

e.g. 

The square shown has 4 sides and $\frac{1}{2}(4)(4-3) = 2$ diagonals.

If a polygon has 54 diagonals, how many sides does it have? **5**

END OF QUESTION PAPER