

# ELGIN ACADEMY

*Prelim Examination 2005 / 06*

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

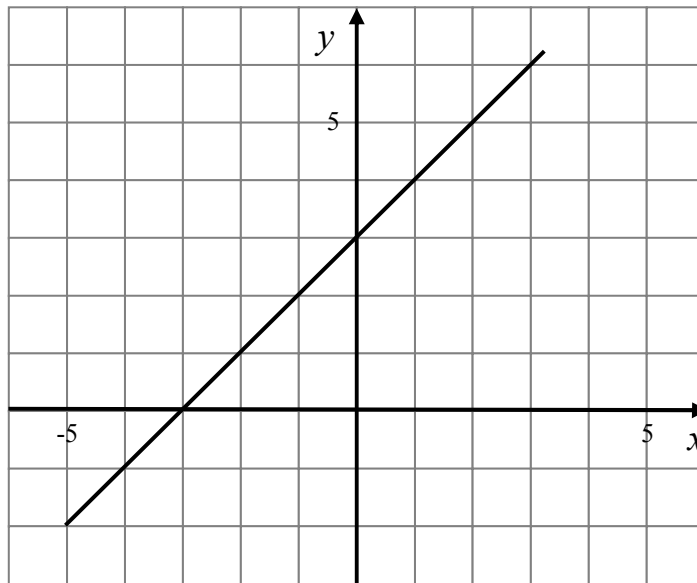
Volume of a cylinder:  $\text{Volume} = \pi r^2 h$

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.

**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. Andrew received this statement for his credit card account

		<h2 style="margin: 0;">Account Statement</h2>			
		REFERENCE: 5245 5634 1277 1398			STATEMENT DATE 16/08/06
DATE OF TRANSACTION	DATE ENTERED	REFERENCE NUMBER	DESCRIPTION	AMOUNT	
21/05/05	22/05/05	AD912	Balance from previous statement Payment Received – Thank You	1875.00 300.00	
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			Balance brought forward	1575.00	
24/05/05	27/05/05	TH0034	The Plaice To Be – Fish and Chips	12.00	
01/06/06	03/06/06	GM032	Disc World – Computer Store	58.00	
06/06/05	10/06/05	HJ202	Bid On Line	310.00	
10/06/05	12/06/05	UY932	Asway	125.00	
CREDIT LIMIT		AVAILABLE CREDIT	MINIMUM PAYMENT	TO REACH US BY	PRESENT BALANCE
£3600				03/07/05	£

Unfortunately as he opened the envelope the corner of the statement got torn.

- (a) Calculate the entry which has been torn off. 2
- (b) What is his available credit? 1
- (c) To reduce his balance a bit faster Andrew decided to pay off 25% of his balance instead of the minimum 5%.

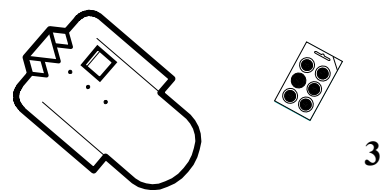
How much would he pay in this month? 2

4. (a) Multiply out  $(3x + 1)(x - 2)$  1
- (b) Hence or otherwise, simplify the following expression leaving your answer in fully factorised form.

$$4x^2 - (3x + 1)(x - 2) - 2x \quad \text{4}$$

5. Joan works for a company that manufactures shirts. Her job is to stitch the buttons on them and she gets paid 75p for each one she completes. She also gets a basic wage of £6.50 an hour.

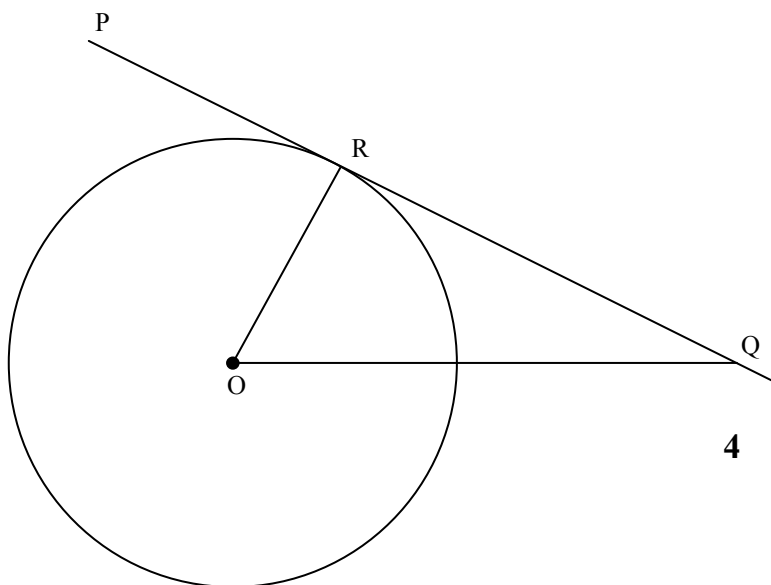
Calculate Joan's total wage in a week when she works for 30 hours and manages to complete 200 shirts.



6. 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  $OQ = 10\text{cm}$  calculate the length of RQ.



7. Jenni took out a loan for £6000 which eventually would cost her £900 in interest charges.

How much would she have to pay in each month if she wanted to clear the loan in 30 months?

2

***END OF QUESTION PAPER***