

ELGIN ACADEMY

Prelim Examination 2007 / 08

<p>MATHEMATICS National Qualifications - Intermediate 2 Maths 1, 2 and Applications Paper 1 (non-calculator)</p>
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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: $\text{Area} = \frac{1}{2} ab \sin C$

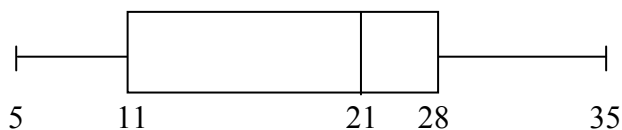
Volume of a sphere: $\text{Volume} = \frac{4}{3} \pi r^3$

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 boxplot shows the number of hours of TV watched in a week by a group of students.



Calculate the semi-interquartile range.

[2]

2. Multiply out the brackets and collect like terms.

$$(5p - 2q)(3p + q)$$

[2]

3. A spreadsheet was used to record the number of visitors to a Home Show over 5 days.

	A	B	C	D	E
1	DAY	MORNING	AFTERNOON	EVENING	
2	Thursday	324	545	576	
3	Friday	265	657	784	
4	Saturday	567	754	268	
5	Sunday	421	1279	835	
6	Monday	532	345	238	
7					

- (a) What formula should be entered into cell E2 to find the total number of visitors to the exhibition on Thursday?

[1]

- (b) What number will appear in this cell when this formula is entered?

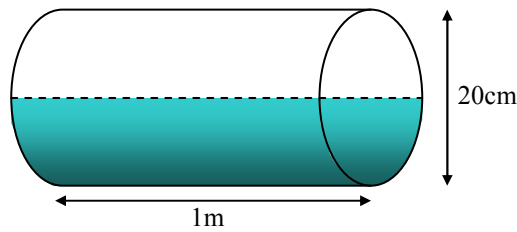
[1]

4. Multiply out the brackets and simplify

$$8 - 3(4x - 5) + 6x$$

[3]

5. A cylindrical oil drum is being stored on its side. It has a diameter of 20cm and length 1m.



If it is half full, how many litres of oil are in it? [Take $\pi = 3.14$]

[5]

6. The 'running times' of a selection of children's DVDs are as follows:

90 90 93 88 93 89 94 96 93 95 91 94
96 89 93 97 91 91 97 95 96 95 96 89

(a) Show this information in a dot-plot.

[2]

(b) Calculate the semi-interquartile range for this data.

[3]

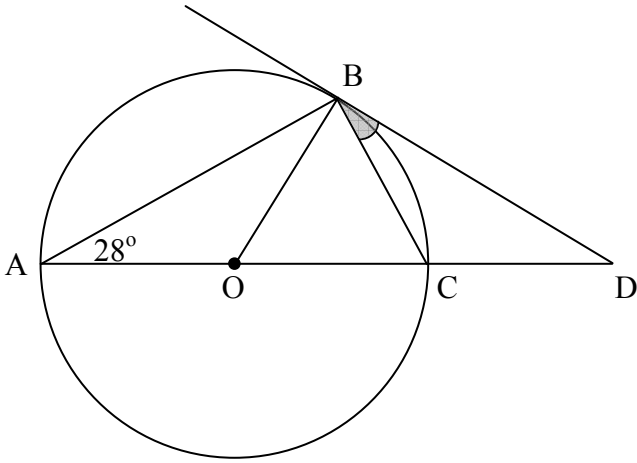
(c) Jenna wanted to watch a DVD. What is the probability that the one she chooses will have a 'running time' of **more than** 90 minutes?
Give your answer in its simplest form.

[2]

7. Factorise $x^2 - 3x - 28$

[2]

8.



In the diagram shown, BD is a tangent to the circle centre O.
Angle BAC = 28° .

Calculate the size of angle CBD.

[3]

9. A group of students were asked how many times they had visited the cinema in last month. The frequency table shows the results.

Number of Visits (x)	Numbers of students (f)
0	2
1	8
2	10
3	12
4	5
5	2
6	1

Calculate the mean number of times this group of students had visited the cinema in the last month.

[4]

END OF QUESTION PAPER