

ELGIN ACADEMY

Prelim Examination 2007 / 2008

MATHEMATICS Standard Grade - Credit Level

Paper 2

Time allowed - 80 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 use a calculator**

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

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

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1. Miss Pitstop has just bought a brand new car costing £17 500.

During the first year the value of the car is predicted to fall by 14% then by 6.5% every successive year thereafter.

How much is the car worth after 4 years? Give your answer correct to 2 significant figures.

2. The number of telephone calls a Call Centre receives every hour over a six hour period on a weekday is recorded and the results are shown below.



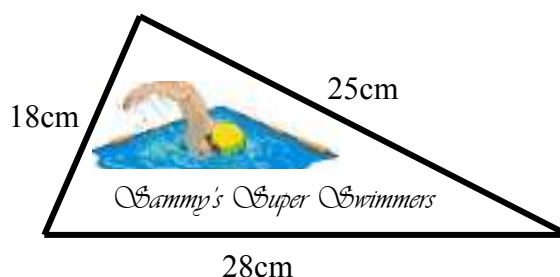
45 49 48 52 55 57

(a) Find the mean and standard deviation for the data given above.

(b) The same recordings were taken over a six hour period during the weekend. The mean number of calls taken was 54 and the standard deviation was 3.6.

Make two comparisons between data recorded on a weekday and data recorded on a weekend.

3. Calculate the area of cloth used to make this triangular club pennant, with sides 18cm, 25cm and 28cm, as shown below.

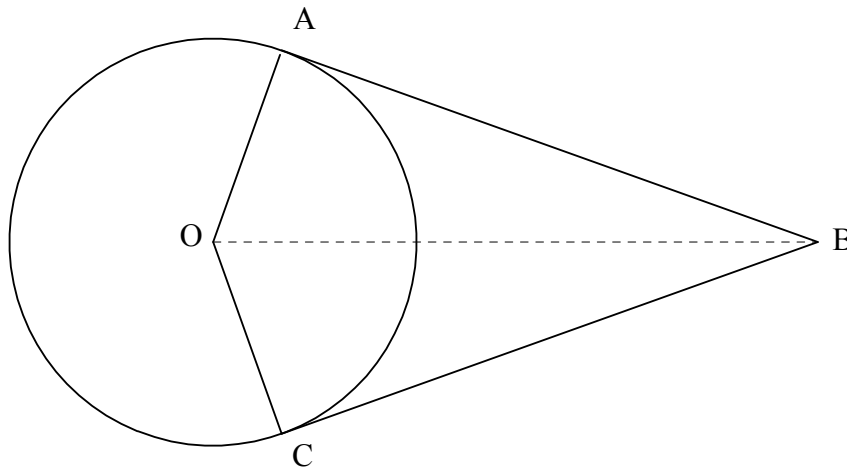


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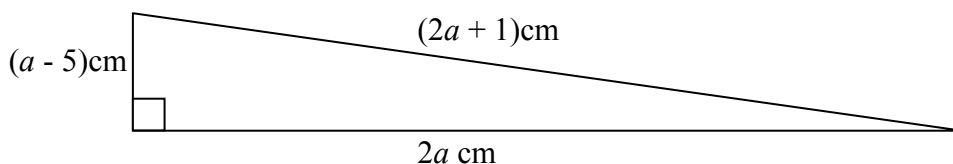
4. Solve the following equation giving your answer **correct to 1 decimal place**.

$$3x^2 - 7x - 5 = 0$$

5. Figure OABC is a tangent kite with OA = 4cm and AB = 8cm..



- (a) Calculate the size of $\angle ABC$
- (b) Calculate the area of kite OABC.
6. Mr Bell paid a bill for £1 706.60 to his builders for a roof repair. This price included a discount of 8% for paying his bill on time. How much **extra** would Mr. Bell have had to pay if he had been late with his payment?
7. The lengths of the sides of a right angled triangle are $2a$ cm, $(2a + 1)$ cm and $(a - 5)$ cm.

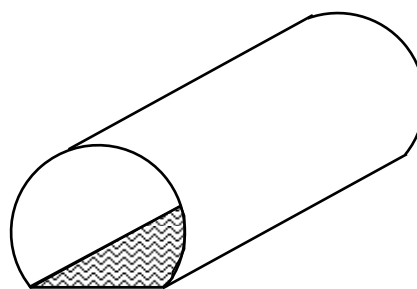


- (a) Calculate the value of a .
- (b) State the perimeter of the shape.

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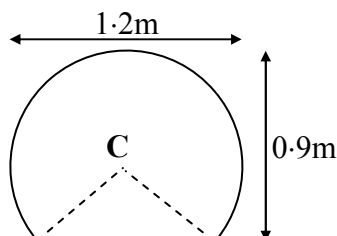
8. Shown is a children's play tunnel which has been fitted with a rectangular insulating mat .

The end of the tunnel consists of part of a circle, centre C , with diameter 1.2 metres.

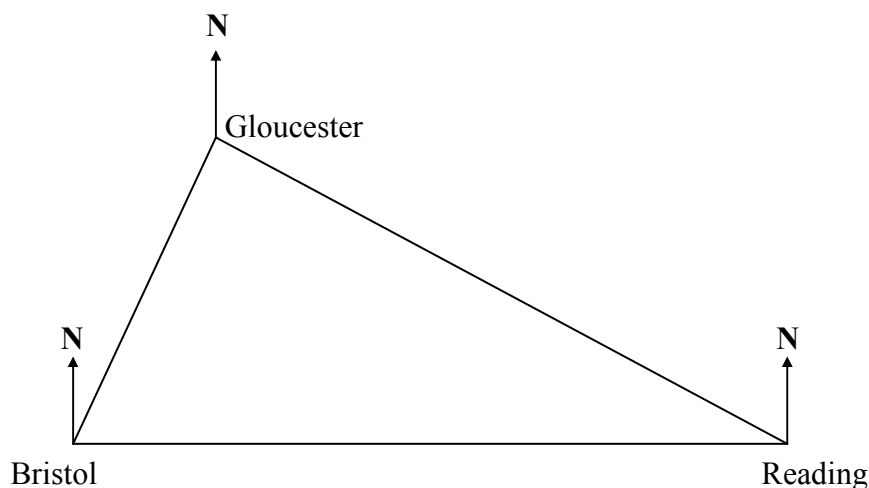


The height of the tunnel is 0.9 metres.

Calculate the area of the mat if the tunnel is 7 metres long.



9. Reading is 105 kilometres due east of Bristol. The bearing of Gloucester from Bristol is 024° and from Reading is 300° .



Calculate the distance between Gloucester and Reading to the nearest kilometre.

10. The time, T minutes, taken to mow a square lawn varies **directly** as the square of its length s metres and **inversely** as the breadth b cm of the blade in the lawnmower. A lawnmower whose blade is 30 cm in breadth takes 18 minutes to mow a square of length 6 metres.

The gardener has just mowed a square lawn in 20 minutes. Another lawn has a side which is **twice** as long and the gardener wants to mow this lawn in the **same** time. By what number would the blade's length in the lawnmower have to be multiplied in order to achieve this?

END OF QUESTION PAPER