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Class:	
	50



Cedar Girls' Secondary School End-of-Year Examination 2006

Subject : Mathematics

Paper : Section A

Level : Secondary Two

Duration : 1 hour

Date : 5 Oct 2006

INSTRUCTIONS TO CANDIDATES

All questions in Section A must be attempted.

- Answers to Section A are to be written in the SPACES provided in the question booklet.
- The use of calculators is not allowed in the computation of answers in Section A.
 All calculators must be placed on the floor.
- 4. Working must be shown clearly in ink.
- 5. Omission of essential working will result in loss of marks.
- Section A will be collected after 1 hour.
 You can begin to work on Section B before the end of 1 hour provided that the calculator is not used.

Additional Materials:

7 Nii

This section consists of <u>9</u> printed pages

Section A [50 marks] ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER

- 1 Express, correct to 2 significant figures,
 - (a) 237.135,
 - **(b)** 0.005193.

Answer: (a) [1]

(b) [1]

- 2 Using as much of the information given below as is necessary, find
 - (a) $\sqrt{36700}$,
 - **(b)** $\sqrt{0.367}$

 $[\sqrt{3.67} = 1.92, \sqrt{36.7} = 6.06.]$

Answer: (a) [1]

(b) [1]

- 3 (a) Simplify $\frac{a^4}{b^3} \times \left(\frac{b}{2a}\right)^2 \div b^0$.
 - **(b)** Evaluate $\frac{11}{4} 2\frac{2}{5} \times \left(\frac{1}{2} \frac{2}{3}\right)$.

Answer: (a) [2]

(b) [2]

- A length of 2 cm on a map represents an actual distance of 6 000 m. Calculate

 (a) the R. F. of the map,
 - (b) the actual area represented by 10 cm² on the map, giving your answer in square kilometres.

Answer: (a) [1]

(b) [2]

[2]

5 Factorise completely

- (a) 5x 3xy + 6ay 10a,
- **(b)** $9n^4 81n^2$.

Answer: (a)

(b) [2]

6 (a) Simplify $n^2 - (n-2a)(n+2a)$.

(b) Hence, write down the value of $12735^2 - 12731 \times 12739$.

Answer: (a) [2]

(b) [2]

- 7 Solve the equation
 - $(a) \qquad \frac{16}{u} \frac{u}{4} = 0,$
 - **(b)** $\frac{1}{(t+2)} = \frac{2t-1}{3}$

Answer: (a) [2]

(b) [3]

8- Express as a single fraction in its simplest form

$$\frac{x}{2x^2-8} + \frac{x+1}{x-2} - \frac{x-1}{x+2}.$$

Answer:

[3]

9 Solve the simultaneous equations

$$\frac{1}{u+v} - \frac{1}{u-v} = -4$$

$$\frac{1}{u+v} + \frac{1}{u-v} = 12.$$

Answer:

[4]

The variables x and y are connected by the equation $x = ay^b$, where a and b are constants. Pairs of corresponding values of x and y are given in the table below.

у	0	1	2	3
x	0	2	16	С

Find the values of a, b and c.

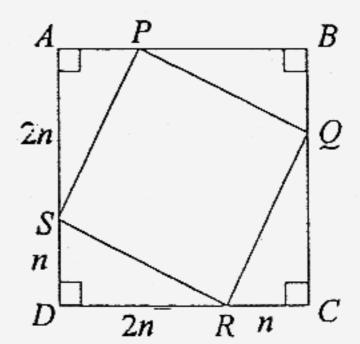
Answer:

[4]

ABCD is a square in which AS = DR = 2n cm and SD = RC = n cm. The area of the square PQRS is 400 cm².

Calculate

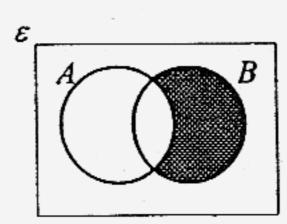
- (a) the value of n^2 ,
- (b) the area of square ABCD.



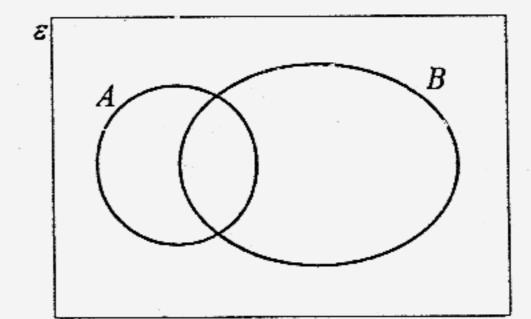
Answer: (a) [2]

(b) [2]

12 (a) For the Venn diagram below, express the shaded region in set notation.



(b) In the Venn diagram shown below, $\varepsilon = \{x : 4 \le x \le 20, x \in Z\},\$ A = x : x is a multiple of 3, B = x : x is an odd number.



- (i) Add the set C to the Venn diagram where $C = \{x : x \text{ is a prime number}\}.$ [1]
- (ii) Find $n(A \cup B)'$.
- (iii) Find $(A \cap B) \cap C$.

Answer: (a)	[1]
(b) (ii)	[1]
(b) (iii)	[1]

13	In a class of 40 pupils, 25 of them have been to China and 17 of them have been
	to Japan. Find the smallest and largest possible number of pupils who have been
	to both countries.

Answer: [2]

A six-faced die was thrown 20 times. The table shows the number of times that each possible score occurred.

Score	1	2	3	4	5	6
Frequency	2	х	4	4	4	у

- (a) Find the value of x + y.
- (b) If the modal score was 2, find the largest possible value of y.
- (c) After the 19th throw, the median score was 3. Find the largest possible value of x.
- (d) The mean score of all 20 throws was 3.5, find the values of x and y.

Answer: (a) [1]

(b) [1]

(c) [1]

(d) [2

End of Section A



Cedar Girls' Secondary School End-of-Year Examination 2006

Subject: Mathematics

Paper : Section B

Level : Secondary Two

Duration: 1 hour 15 minutes

Date : 5 October 2006

INSTRUCTIONS TO CANDIDATES:

- All questions must be attempted.
- Answers are to be written in the writing paper provided.
- 3. Begin each question on a fresh page.
- The use of calculators is allowed in the computation of answers.
- Working must be shown clearly in ink.
- 6. Omission of essential working will result in loss of marks. The intended marks for the question or parts of the question are given in brackets [].
- 7. If the degree of accuracy is not specified in the question, and if the answer is not exact, the answers should be given to 3 significant figures. Answers in degrees should be given to 1 decimal place.
- 8. Attach the cover page provided to the top of your answer scripts of Section B.

Additional Materials:

- 4 sheets of writing paper
- 2 sheets of graph paper

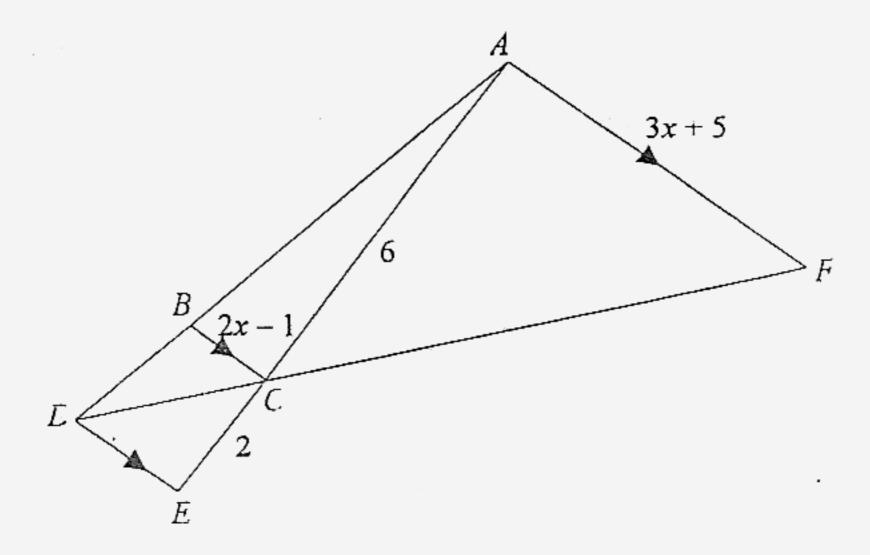
This section consists of 7 printed pages.

Section B [50 marks] Answer ALL questions. Calculators may be used for this section.

The daily distances, in kilometres, travelled by a salesman in 30 days are shown below in the stem-and-leaf diagram.

- (a) Construct a grouped frequency table for the data above using the class intervals of $11 \le d \le 30$, $31 \le d \le 50$, $51 \le d \le 70$ and $71 \le d \le 90$, where d is the distance travelled in kilometres. [2]
- (b) Using the table that you have constructed in (a) above,
 - (i) state the modal class, [1]
 - (ii) find the median distance travelled, [2]
 - (iii) find the estimated mean distance travelled. [2]
- (c) If a distance is chosen at random from the 30 days, find the probability that the distance travelled by the salesman is
 - (i) less than 35 km, [1]
 - (ii) between 45 km and 65 km, [1]
 - (iii) at least 85 km. [1]
- In the diagram below, DE is parallel to BC and AF. AC = 6 cm, CE = 2 cm, BC = (2x - 1) cm and AF = (3x + 5) cm.

Triangle BCD is similar to triangle AFD.



- (a) Name another pair of similar triangles. [1]
- (b) Find the ratios $\frac{BC}{DE}$ and $\frac{DE}{AF}$. Hence, find the value of x. [4]
- (c) If the area of triangle $DEC = 5.6 \text{ cm}^2$, calculate the area of triangle ACD.
- (d) Write down the ratio

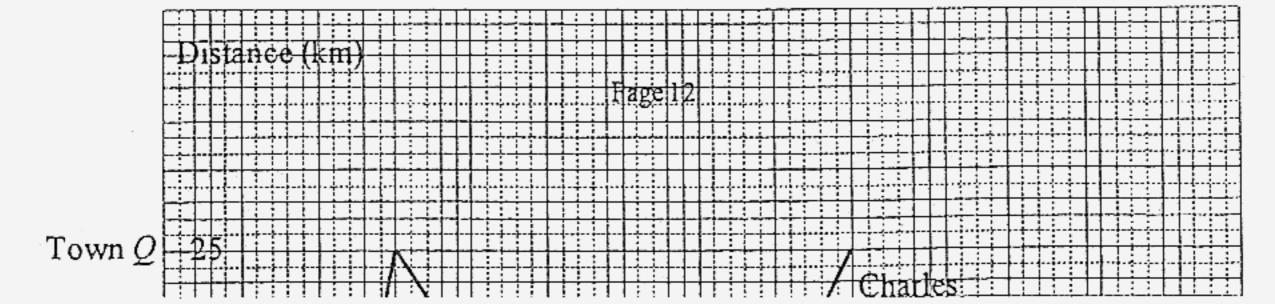
height of triangle DEC: height of triangle FAC.

Area of Triangle
$$DEC$$

Hence, find the value of Area of Triangle FAC

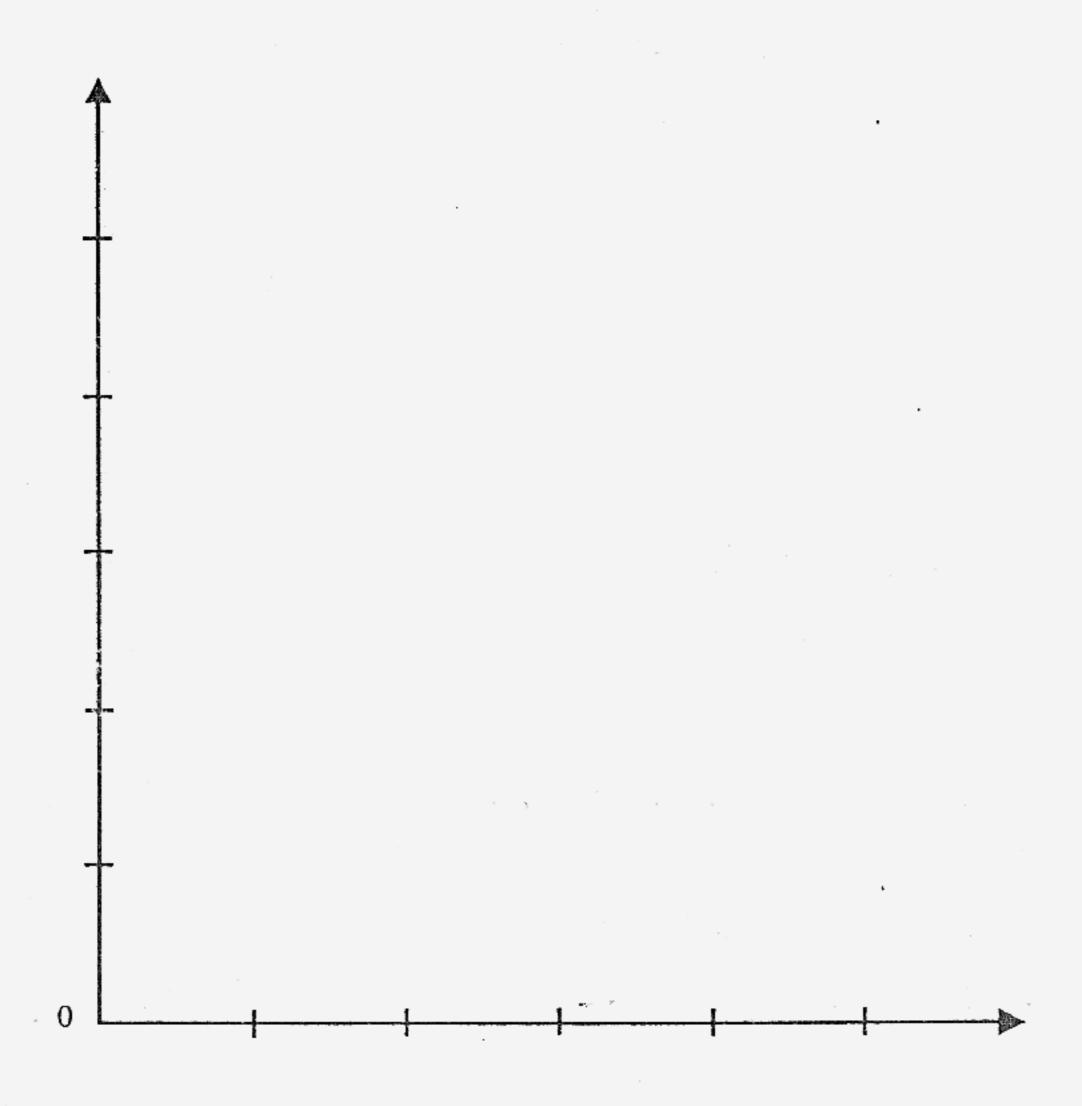
[2]

The graph below shows the journeys of two cyclists, Charles and Keith, between P and P and Q.



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[1]

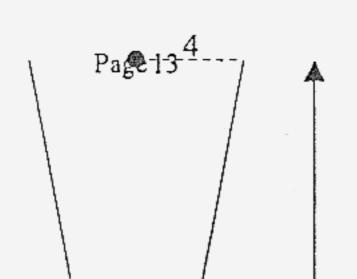


(a)	When did Charles begin his journey?	[1]
(b)	How long did Charles rest?	[1]
(c)	When and where did the two cyclists meet each other?	[2]
(d)	What distance did Keith cover while Charles was resting?	[1]
(e)	Calculate Keith's average speed for his return journey.	[2]
(f)	If Charles had travelled at the initial constant speed throughout his	joum e y,

18 [The value of π is 3.142, correct to three decimal places.]

at what time would he reach Town Q?

A drinking glass is made up of a hollow cone attached to a solid hemispherical base



as shown in the diagram below.

The hemisphere has a radius of 3 cm.

The radius of the top of the cone is 4 cm and the height of the cone is 30 cm.

- (a) Write down the overall height of the drinking glass. [1]
- (b) Calculate the total surface area of the solid hemispherical base. [2]
- (c) Calculate the exterior curved surface area of the cone. [2]
- (d) (i) The cone contains liquid to a depth of h cm.

 Show that the radius of the surface of the liquid is $\frac{2}{15}h$ cm. [1]
 - (ii) The cone is completely filled with liquid.

 Calculate the volume of the liquid in the cone.

 [1]
 - (iii) One-third of the volume of liquid from the full cone is now poured out.

 Using the answers to parts (i) and (ii), find the depth of the liquid that remains in the cone.

 [2]
- (e) Given that the density of material used to make the solid hemispherical base is 6 g/cm³. Find the mass, in kilograms, of the material. [2]
- 19 Answer the whole of this question on a sheet of graph paper.

The table gives the x and y coordinates of some points which lie on a curve.

х	-1	0	1	2	3	4	5	6
у	-3	0	2	3	3	2	0	-3

(a) Using a scale of 2 cm to represent 1 unit, draw a horizontal x-axis for $-1 \le x \le 6$.

Using a scale of 2 cm to represent 1 unit, draw a vertical y-axis for $-3 \le y \le 3$.

On your axes, plot the points given in the table and join them to form a smooth curve.

[3]

- (b) Use your graph to find
 - (i) the value of y when x = 4.6,

[1]

(ii) the value(s) of x when y = 1.8.

[2]

(c) The line x = k is a line of symmetry of the curve.

Find the value of k and draw this line on your graph.

[2]

(d) The values x and y are related by the equation

$$y = \frac{1}{2} \left(Ax + Bx^2 \right).$$

(i) Use the fact that the point (2, 3) lies on the curve to show that

$$3 = A + 2B.$$
 [2]

(ii) Obtain a second equation connecting A and B.

Hence, calculate the value of A and of B.

[3]

End of Section B

	7(b) $t = -2\frac{1}{2}$ or 1	6(a) $4a^{2}$ 6(b) 16, for your info: hence means using $4a^{2}$, $a = 2$ 7(a) $u = \pm 8$	$4(a) R.F. = \frac{1}{300000}$ $4(b) 90 km^{2}$ $5(a) (x - 2a)(5 - 3y)$ $5(b) 9n^{2}(n + 3)(n - 3)$	3(a) $\frac{a^2}{4b}$, for your info: $b^0 = 1$ 3(b) $3\frac{3}{20}$	2(a) 192 2(b) 0.606	1(a) 240 1(b) 0.0052
	14(a) x + y = 6 14(b) 1 14(c) 5 14(d) x = 4, y = 2	12(b)(ii) 6 12(b)(iii) ф 13 2, 17	12(a) $A \cap B$ 12(b)(i) ε A C B	10 $a = 2$, $b = 3$, $c = 54$ 11(a) $n^2 = 80$ 11(b) 720 cm ²	$9 u = \frac{3}{16} v = \frac{1}{16}$	8 $\frac{13x}{2(x+2)(x-2)}$ Section A
19(b)(i) $y = 1 (\pm 0.2)$ (ii) $x = 0.85$ or 4.15 (± 0.2) 19(c) $k = 2.5$ (d)(ii) $A = 5$, $B = -1$	18(a) 33 cm (b) 84.8 cm ² (c) 381 cm ² 18(d)(ii) 503 cm ³ (iii) 26.2 cm 18(e) 0.340 kg	17(a) 09 30 hours (b) 1.5 hours 17(c) 11 18-11 21 h, 15 km away from Town P (or: 10 km away from Town Q) 17(d) 11-11.5km (e) 6.25 km/h (f) 11 10-11 12 h	ΔΕCD) .8 (c) 16.8 cm ²	15(b)(i) $11 \le d \le 30$ (ii) 47.5 km (iii) 47.8 km (III) $\frac{1}{3}$ (iii) $\frac{3}{10}$ (iii) $\frac{2}{15}$	$11 \le d \le 30$ 9 $31 \le d \le 50$ 8 $51 \le d \le 70$ 6	Section B km) Frequency