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| **MOCK EXAMINATION, FebruaryARY 2010** |
| **Name OF THE CANDIDATE** |  |
| **Class: 10** | **Subject: igcse Mathematics core** |
| **Calculator model** |  |

**MATHEMATICS**

**Paper 3 (Core)**

**Total Marks: 104**

**Candidates answer on the Question Paper**.

Additional Materials:

Electronic calculator

Geometrical instruments

**TIME: 2 hours**

**INSTRUCTIONS AND INFORMATIONS TO CANDIDATES:**

 Write your Name, Class, and Section on all the work you hand in.

Write in dark blue or black pen on both sides of the paper.

You may use a pencil for any diagrams or graphs.

Do not use glue or correction fluid.

 Answer **all** questions

If working is needed for any question it must be shown below that question.

Marks will be given for working, which shows that you know how to solve the problem even if you get the answer wrong.

The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is 104.

Electronic calculators should be used.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For *π*, use either your calculator value or 3.142.

………………………………………………………………………………………………………

**This question paper consists of 22 printed pages.**

1. (a) Roberto owns 6000 square meters of land.

 He divides it between himself and his two children, Stefano and Tania, in the ratio

 Roberto : Stefano : Tania = 7 : 5 : 3.

1. Show that Roberto now has 2800 square meters of land.

 Answer(a)(i)……………[2]

1. Calculate the area of land that Stefano and Tania each have.

 Answer(a) (ii) Stefano……….. $m^{2}$

 Tania…………. $m^{2}$ [2]

 (b) Roberto receives a rent of $1.40 per month for each square metre of his land.

1. Calculate the rent he receives in one year from his 2800 square metres of land.

 Answer(b)(i) $ ………….. [2]

1. Roberto uses$ \frac{3}{5}$ of this amount to buy more land.

 Calculate the amount that he uses to buy more land.

 Answer(b)(ii) $ …………….. [2]

(c) Stefano builds a house on his land.

 He borrows $5000 from a bank at 8% per year simple interest.

 Find the total amount of interest he will have paid at the end of 3 years.

 Answer(c) $ ……...... [2]

(d) Tania sells her land for $12 000.

 She invests the money for 3 years at 6% per year compound interest.

 Calculate the total amount of money she will have at the end of the 3 years.

 Give your answer to the nearest dollar.

 Answer(d) $ …………… [4]

 (Total 14marks)

2. The diagram represents a fairground wheel with centre O, and diameter 30 meters.

 Point D is vertically below point A, and the line EDB is horizontal. ED = 20 meters.



1. A seat starts at B and travels one-third of the circumference to A.

Explain why angle AOB equals 120°.

 Answer(a) …………[1]

1. Find the value, in degrees, of
2. angle ABO,

 Answer(b)(i) Angle ABO = …… [1]

1. angle BAC,

 Answer(b)(ii) Angle BAC = ……… [1]

1. angle ABD.

 Answer(b)(iii) Angle ABD =……….. [1]

1. (i) Use trigonometry in triangle ABC to calculate the distance AB.

 Answer(c)(i) AB = …………… .. m [2]

1. Show that AD = 22.5 meters.

 Answer(c)(ii) …………………[2]

1. Eshe holds her camera at E and takes a photograph of her friend in the seat at A.

Calculate angle AED.

 Answer(d)…………… [2]

 (Total 10marks)

3. (a) Garcia and Elena are each given x dollars.

 (i) Elena spends 4 dollars.

Write down an expression in terms of x for the number of dollars she has now.

 Answer(a)(i) $ ……………. [1]

(ii) Garcia doubles his money by working and then is given another 5 dollars.

 Write down an expression in terms of x for the number of dollars he has now.

 Answer(a)(ii) $........................ [1]

(iii) Garcia now has three times as much money as Elena.

 Write down an equation in x to show this.

 Answer(a)(iii)………………… [1]

1. Solve the equation to find the value of x.

 Answer(a)(iv) x =………………….. [3]

 (b) Solve the simultaneous equations

 $3x-2y=3$

 $ x+4y=8$

 Answer(b) x = ……………..

 y = ……………… [3]

 (Total 9 marks)

4.

 

 A quadrilateral ABCD, a line l and a point O are shown on the grid above.

1. Write down the mathematical name for the quadrilateral ABCD.

 Answer(a) ……………….[1]

(b) On the grid above, draw the images of the quadrilateral ABCD under the

 following transformations.

(i) Translation by the vector$\left( \begin{matrix}9\\-3 \end{matrix} \right)$. Label this image P. [2]

(ii) Reflection in the line l. Label this image Q. [2]

(iii) Rotation, centre A, through 90° anti-clockwise. Label this image R. [2]

(iv) Enlargement, centre O and scale factor 3. Label this image S. [3]

 (Total 10marks)

5. In the pattern below each diagram shows a letter E formed by joining dots.



(a) Draw the next letter E in the pattern. [1]

(b) Complete the table showing the number of dots in each letter E.



 [3]

1. How many dots make up the letter E in
2. Diagram 10,

 Answer(c)(i)……………….. [2]

1. Diagram n?

 Answer(c)(ii) ………….. [2]

1. The letter E in Diagram n has 113 dots.

Write down an equation in n and use it to find the value of n.

 Answer(d) n =………………… [3]

 (Total 11marks)

6.



At midday, a ship is somewhere along the line from A to C.

1. By measuring an angle, write down the three figure bearing of the ship from A.

 Answer(a)………………….. [2]

1. The coastguard at B sees the ship on a bearing of $350^{0}$
2. On the diagram draw accurately the line showing a bearing of$ 350^{0}$

 from B. [1]

 (ii) On the diagram mark the position of the ship, S. [1]

1. (i) Measure the length, in centimetres, of the line AB on the diagram.

 Answer(c)(i) cm…………………… [1]

 (ii) The distance from A to B is 14 kilometers.

 Calculate the scale of the drawing.

 Give your answer in the form 1:n.

 Answer(c)(ii) 1: ………………. [2]

 (d) The ship is sailing straight for the rocks, R.

 There is a lighthouse at A.

 The range of the light from the lighthouse is 10 kilometres.

 (i) Using your scale, draw the locus of points that are 10 kilometres from A. [2]

 (ii) Draw the line SR on the diagram.

How far is the ship from the rocks when the light from the lighthouse is first seen on the ship?

 Answer(d)(ii) ……………….km [2]

 (Total 11marks)

7. The cuboid shown in the diagram has *EF* = 4 cm, *FG* = 6 cm and *AE* = 3 cm.

 

1. Calculate
2. the volume of the cuboid,

 *Answer (a)(i)* …………………… $cm^{3 }$[2]

 **(ii)** the surface area of the cuboid.

 *Answer (a)(ii)* …………………… $cm^{2}$ [3]

**(b)** The cuboid is divided into two equal triangular prisms. One of them is shown in the diagram.

 

1. Write down the volume of the triangular prism.

 *Answer (b)(i)* …………………… $cm^{3 }$ [1]

1. Work out the area of the rectangle *AFGD*.

 *Answer (b)(ii)* ……………………$cm^{2 }$ [3]

 (Total 9 marks)

8. (a) The list shows the rainfall in millimeters in Prestbury for the 12 months of 2002.

 61 146 22 54 67 94 141 22 37 167 87 170

1. Write down the mode.

 Answer(a)(i) …………mm [1]

1. Find the median.

 Answer(a)(ii) …………mm [2]

1. Calculate the mean.

 Answer(a)(iii) ………….mm [2]

(b) During the years 1996 - 2000 the total rainfall in Prestbury was 5400 millimetres.

 The pie chart shows how this was spread over the five years.

 

(i) Measure the angles of the sectors for 1998, 1999 and 2000.

 Write your answers in the table below. [3]

(ii) Work out the annual rainfall, in millimetres, for each of the years 1998, 1999 and 2000.

 Write your answers in the table below. [3]

 Answers (b)(i) and (ii)



1. What do you notice about the trend in the rainfall from 1996 to 2000?

 Answer(b)(iii)……………………………………………………………………

 ……………………………………………………………………. [1]

 (Total 12marks)

9.



 Two straight lines labeled A and B are shown on the grid above.

1. Find the gradient of line A.

 Answer(a)……………… [2]

(b) The equation of line B can be written as y = mx + c.

 Find the values of m and c.

 Answer(b) m =……………

 c = …………… [2]

 c) (i) On the diagram draw the line which is parallel to B and passes through the point (1,−1).

 Answer (c)…………… [1]

1. Write down the equation of this line.

 Answer(c) (ii)…………………. [2]

 (Total 7marks)

10. A farmer owns a triangular field ABC.

 A scale diagram of this field is drawn below.

 1 centimeter represents 10 meters.

 

1. (i) Complete the following statement.

 The side of the field, AC, is ………….. metres long. [1]

 (ii) Measure, in degrees, the angle ACB.

 Answer(a)(ii) Angle ACB = ………………….. [1]

In the following parts, leave in all your construction lines.

1. The farmer divides the field with a fence from A to the side BC.

 Each point on the fence is the same distance from AB as from AC.

 (i) Using a straight edge and compasses only, construct the line representing the fence. [2]

 (ii) Write down the length of this fence, in meters

.

 Answer(b)(ii)……… m [1]

 (c) He puts another fence along the perpendicular bisector of the side AC.

 Using a straight edge and compasses only, construct the line representing this fence. [3]

1. He decides to keep goats in the region of the field which is closer to AC than to AB

 and closer to A than to C.

 Label the region G in the field where he can keep goats. [3]

 (Total 11marks)

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