

Centre No.						Paper Reference					Surname	Initial(s)		
Candidate No.						7	3	6	1	/	0	1	Signature	

Paper Reference(s)

**7361/01**

# London Examinations GCE

## Mathematics Syllabus B

### Ordinary Level

#### Paper 1

Friday 11 January 2008 – Afternoon

Time: 1 hour 30 minutes

Examiner's use only

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Team Leader's use only

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**Materials required for examination**

Nil

**Items included with question papers**

Nil

**Candidates are expected to have an electronic calculator when answering this paper.**

#### Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature. Check that you have the correct question paper.

You must write your answer for each question in the space following the question.

If you need more space to complete your answer to any question, use additional answer sheets.

#### Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2).

Full marks may be obtained for answers to ALL questions.

There are 29 questions in this question paper. The total mark for this paper is 100.

There are 20 pages in this question paper. Any blank pages are indicated.

#### Advice to Candidates

Write your answers neatly and legibly.

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1. Write down the next two terms of the sequence

1, -4, 9, -16, ....., .....

Answer .....

Q1

(Total 2 marks)

2. Calculate the Lowest Common Multiple (LCM) of 27, 186 and 558.

Answer .....

Q2

(Total 2 marks)

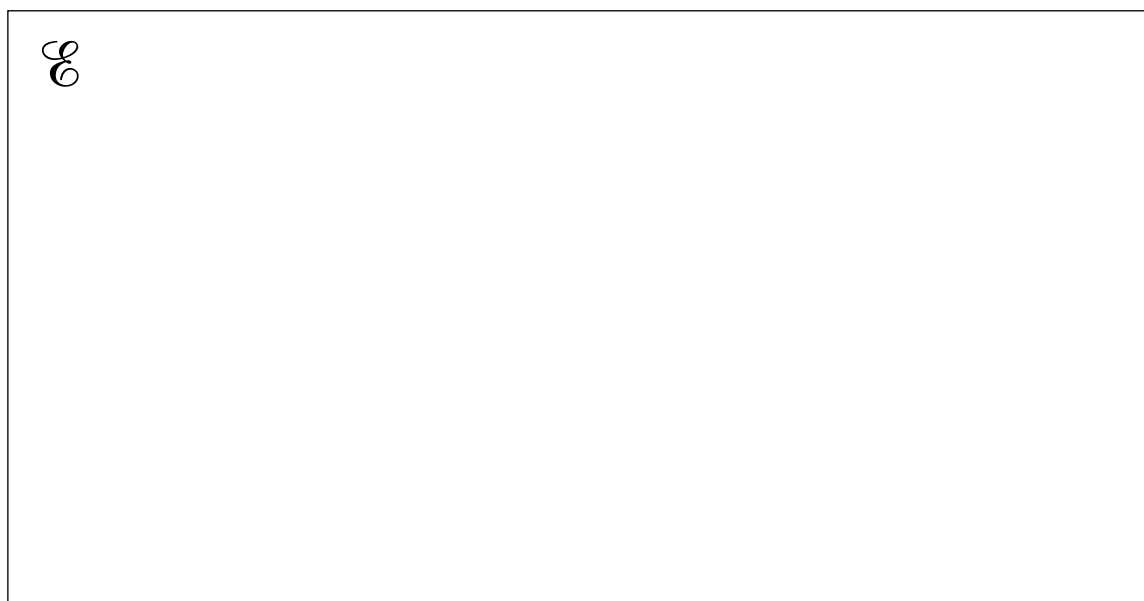
3.  $\mathcal{E} = \{\text{polygons}\},$

$R = \{\text{rectangles}\},$

$Q = \{\text{quadrilaterals}\},$

$G = \{\text{octagons}\}.$

Represent these sets on the Venn diagram.



Q3

(Total 2 marks)



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4. Differentiate, with respect to  $x$ ,  $y = \frac{x^2}{2} - \frac{4}{3x^3}$ .

Answer  $\frac{dy}{dx} = \dots\dots\dots$

Q4

(Total 2 marks)

5. (a) Express  $\frac{7}{329}$  as a decimal to 3 significant figures.

(1)

(b) Express your answer to part (a) in standard form.

(1)

Answers (a) .....

(b) .....

Q5

(Total 2 marks)

6. A number is to be selected at random from

40, 41, 42, 43, 44, 45, 46, 47, 48, 49.

Calculate the probability that this number will not be a prime number.

Answer .....

Q6

(Total 2 marks)



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7. Given that  $\sin x^\circ = 0.5$  and that  $90 \leq x \leq 180$ , find the value, to 3 significant figures, of  $\cos x^\circ$ .

Answer  $\cos x^\circ = \dots\dots\dots$

**(Total 2 marks)**

**Q7**

8. Given the list of numbers,

$$\frac{28}{196}, \frac{\pi}{2}, 97.2, \sqrt{2.25}, \sqrt{8},$$

write down the two irrational numbers in the list.

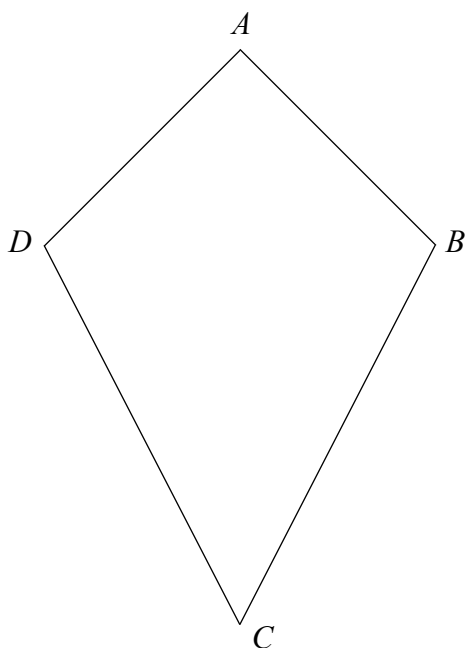
Answers  $\dots\dots\dots$  and  $\dots\dots\dots$

**(Total 2 marks)**

**Q8**



9.



The diagram shows a kite  $ABCD$ .

On the diagram,

(a) draw the line of symmetry of the kite,

(1)

(b) draw the image of the kite after it is rotated  $270^\circ$  clockwise about the point  $C$ .

(1)

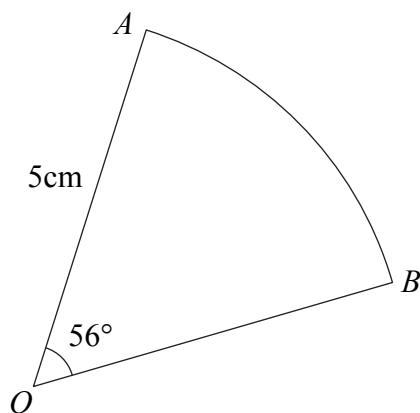
(Total 2 marks)

Q9



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10.



$OAB$  is a sector of a circle, centre  $O$ . The radius of the circle is 5 cm and  $\angle AOB = 56^\circ$ .

Calculate the area, in  $\text{cm}^2$  to 3 significant figures, of the sector  $OAB$ .

Answer .....  $\text{cm}^2$

Q10

(Total 2 marks)

11. Expand and simplify  $\frac{5a^2}{b} \left( 3b + \frac{1}{a^2} \right)$ .

Answer .....

Q11

(Total 2 marks)



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12.



Two ships leave a port  $A$  at the same time. One of the ships travels a distance of 6 km on a bearing of  $040^\circ$  to a point  $B$ . The other ship travels 8 km on a bearing of  $340^\circ$  to a point  $C$ .

Using a scale of 1 cm to represent 1 km,

(a) draw this information on the above diagram. (2)

(b) Use your diagram to find the distance, in km, between  $B$  and  $C$ . (1)

Answer (b) ..... km

(Total 3 marks)

Q12



13. Solve the inequalities

$$-4 \leq 3x + 2 \leq 11.$$

Answer .....

(Total 3 marks)

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Q13

14. (a) Evaluate  $\left(\frac{25}{16}\right)^{\frac{3}{2}}$  as an exact fraction.

(1)

(b) Evaluate  $\left(\frac{25}{16}\right)^{-\frac{3}{2}}$  as a decimal.

(2)

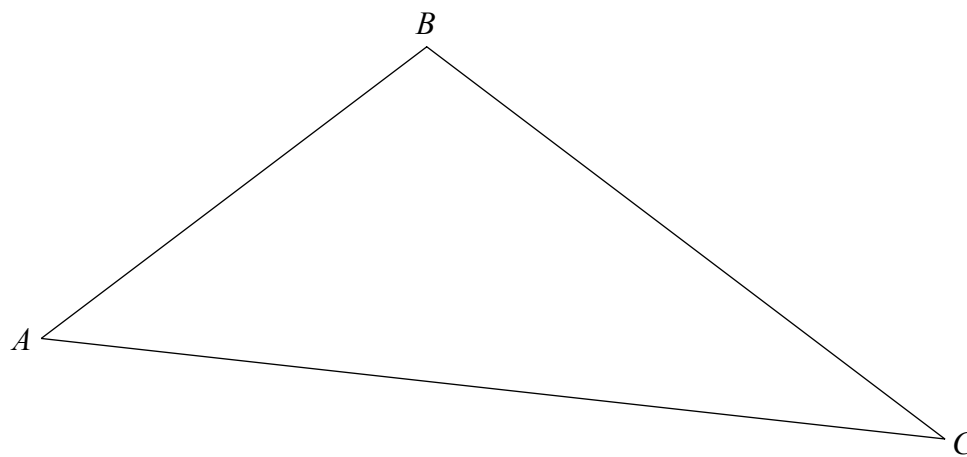
Answers (a) .....

(b) .....

(Total 3 marks)

Q14

15.



$ABC$  is a triangle.

(a) Draw the line which is equidistant from sides  $AB$  and  $AC$ .

(2)

(b) Show, by shading, the region inside the triangle  $ABC$  of points which are closer to  $AB$  than to  $AC$ .

(1)

(Total 3 marks)

Q15





16. One angle of a quadrilateral is  $100^\circ$  and the sizes of the other three angles are in the ratios 1:3:6. Calculate the sizes, in degrees, of the other three angles.

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Answers .....<sup>o</sup> , .....<sup>o</sup> , .....<sup>o</sup>

Q16

(Total 4 marks)

17. On 1st August 2005, the value of a car was £12 600.  
On 1st August 2006, the value of the car had decreased by 10% of its value on 1st August 2005.  
On 1st August 2007, the value of the car had decreased by 5% of its value on 1st August 2006.  
Express the loss in the value of the car over the two years as a percentage of its value on 1st August 2005.

Answer .....%

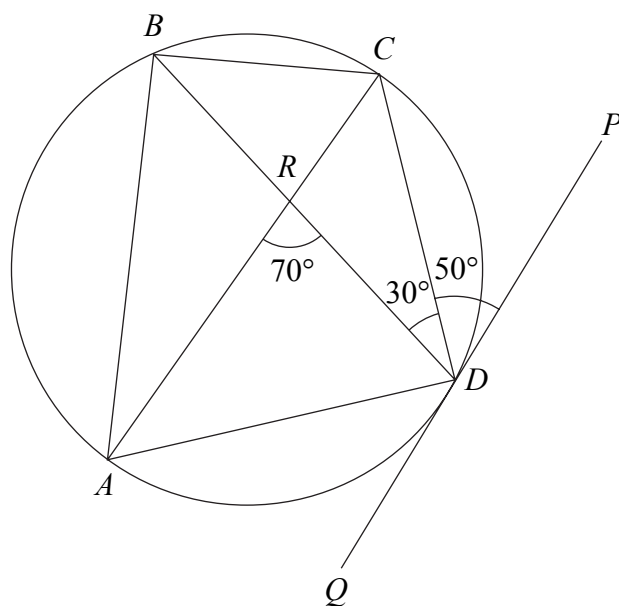
Q17

(Total 4 marks)



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18.



The line  $PDQ$  is the tangent to the circle  $ABCD$  at the point  $D$ . The chords  $BD$  and  $AC$  intersect at the point  $R$ , and  $\angle PDC = 50^\circ$ ,  $\angle CDB = 30^\circ$  and  $\angle ARD = 70^\circ$ .

Find, stating your reasons, the size in degrees of

(a)  $\angle ACD$ , (2)

(b)  $\angle ACB$ . (2)

Answers (a) .....

(b) .....

Q18

(Total 4 marks)

19.  $\mathbf{a} = \begin{pmatrix} 4 \\ 10 \end{pmatrix}$ ,  $\mathbf{b} = \begin{pmatrix} 5 \\ 1 \end{pmatrix}$ ,  $\mathbf{x} = \mathbf{a} - 2\mathbf{b}$ .

(a) Find  $\mathbf{x}$ . (2)

(b) Calculate the modulus of  $\mathbf{x}$ . (2)

Answers (a) .....

(b) .....

Q19

(Total 4 marks)



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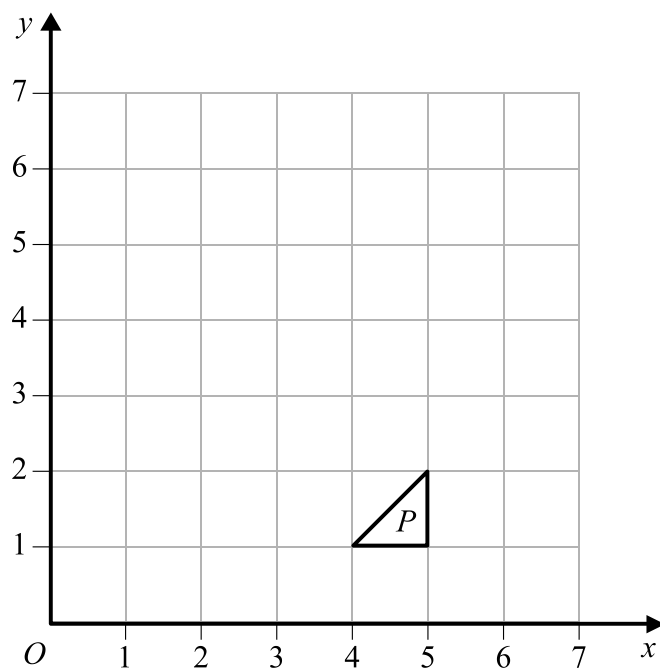
20. The volume of a sphere varies directly as the cube of its radius. The volume of a sphere of radius  $r$  is  $V$ . Find the radius  $R$ , in terms of  $r$ , of a sphere with volume  $64V$ .

Answer  $R = \dots\dots\dots$

Q20

(Total 4 marks)

21.



The coordinates of the vertices of triangle  $P$  are  $(4, 1)$ ,  $(5, 2)$  and  $(5, 1)$ . Triangle  $P$  is enlarged by scale factor 2, centre  $(4, 0)$ , to give triangle  $Q$ .

(a) On the grid, draw and label triangle  $Q$ .

(2)

Triangle  $Q$  is reflected in the line  $y = x$  to give triangle  $R$ .

(b) On the grid, draw and label triangle  $R$ .

(2)

Q21

(Total 4 marks)



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22. Solve for  $x$  and  $y$

$$2x - 3y = 5,$$

$$5x - 2y = -4.$$

Answer  $x = \dots\dots\dots$ ,  $y = \dots\dots\dots$

**(Total 4 marks)**

**Q22**

23. A right circular cone has height 12 cm and base radius 5 cm.

(a) Show that the curved surface area of the cone is  $65\pi \text{ cm}^2$ .

**(2)**

A similar cone has height 36 cm.

(b) Find the curved surface area, in  $\text{cm}^2$ , of this cone in terms of  $\pi$ .

**(2)**

Answers (a)  $\dots\dots\dots$

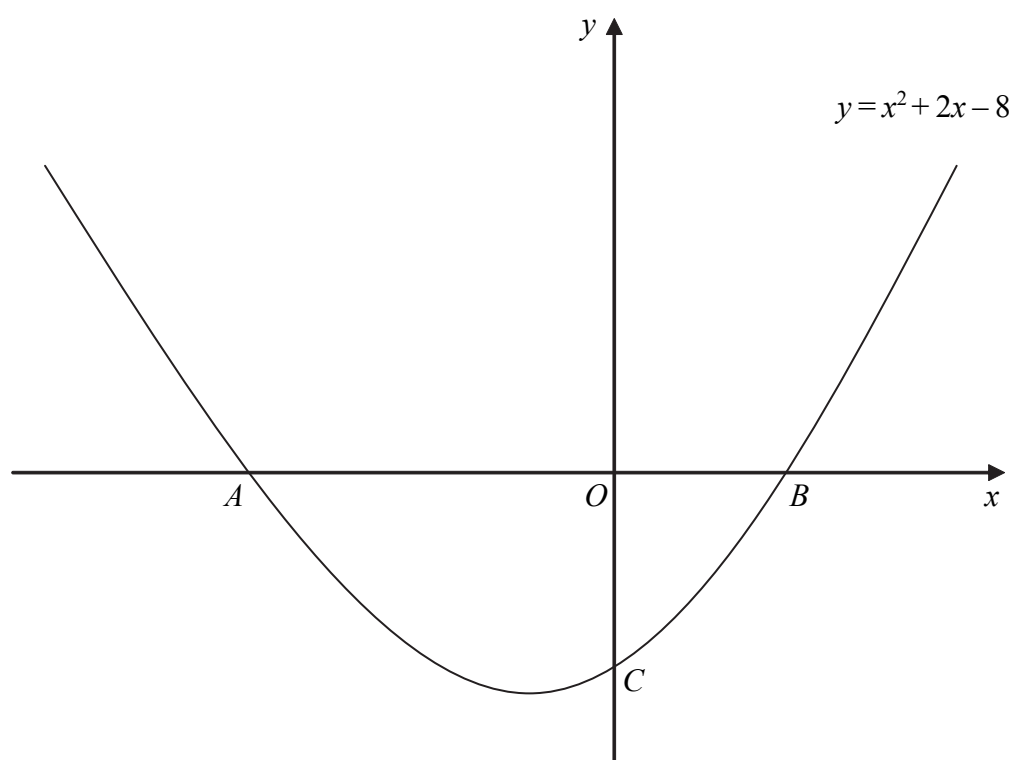
(b)  $\dots\dots\dots \text{cm}^2$

**(Total 4 marks)**

**Q23**



24.



The diagram shows the graph of the curve  $y = x^2 + 2x - 8$ . The curve cuts the coordinate axes at  $A$ ,  $B$  and  $C$ .

Find the coordinates of  $A$ ,  $B$  and  $C$ .

Answers  $A = (\dots\dots\dots, \dots\dots\dots)$

$B = (\dots\dots\dots, \dots\dots\dots)$

$C = (\dots\dots\dots, \dots\dots\dots)$

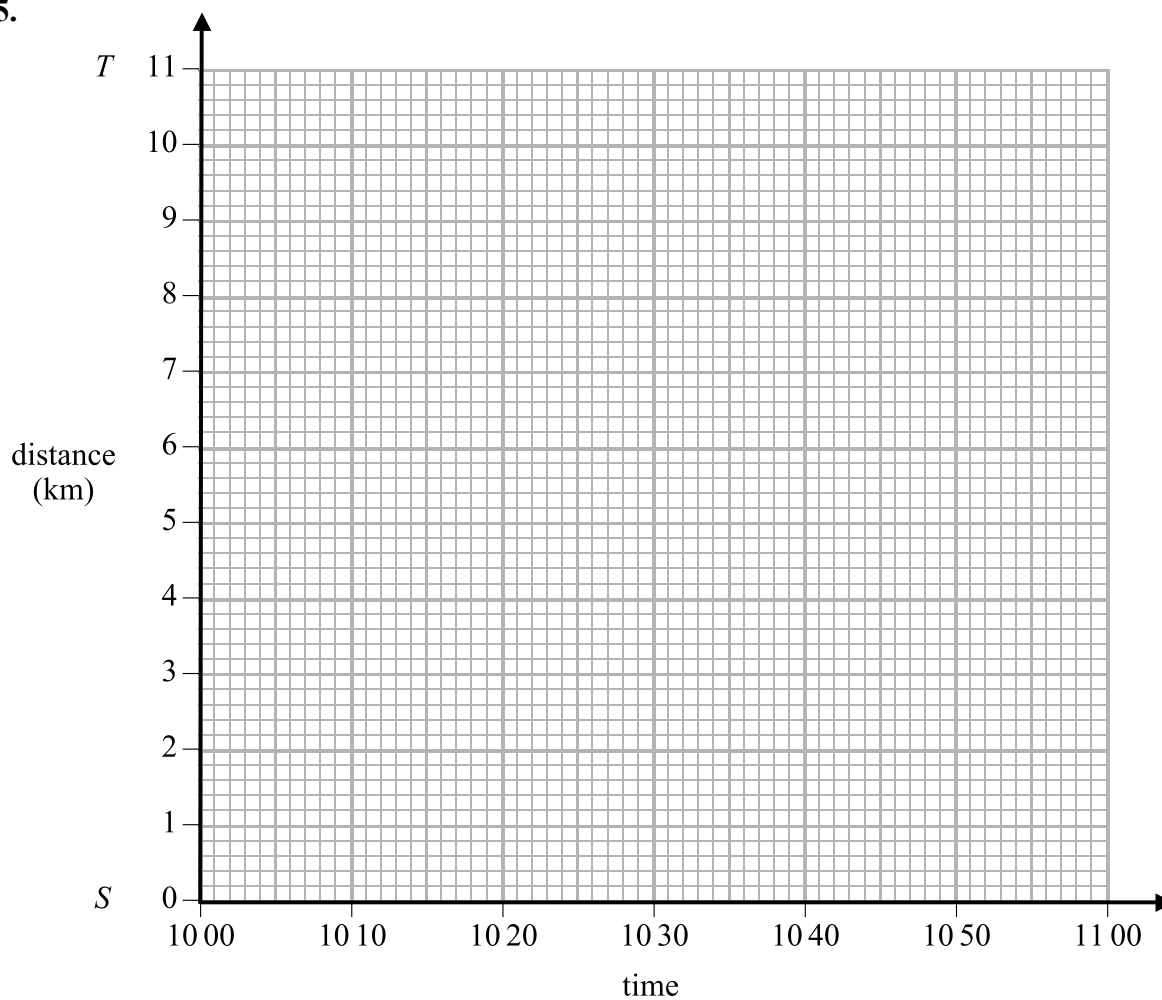
(Total 5 marks)

Q24



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25.



Two towns,  $S$  and  $T$ , are connected by a road. The distance between  $S$  and  $T$  is 11 km. John leaves town  $S$  at 10 00 and cycles along this road at a constant speed of 12 km/h. After 30 minutes he stops and rests for 10 minutes. He then continues his journey to  $T$  at a constant speed, arriving at 11 00.

(a) Draw the distance-time graph for John's journey. (3)

Michael leaves town  $T$  at 10 00. He walks along the same road towards  $S$  for one hour at a constant speed of 3 km/h.

(b) Draw the distance-time graph for Michael's journey. (1)

(c) Write down the time at which John and Michael meet. (1)

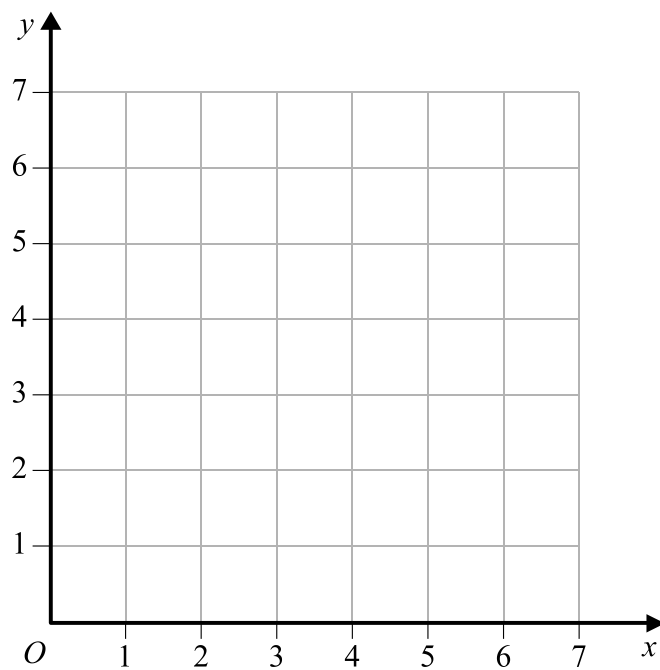
Answer (c) .....

**Q25**

**(Total 5 marks)**



26.



(a) Draw the line with equation  $2x + y = 6$  on the grid. (1)

$x$  and  $y$  are positive integers such that  $2x + y \leq 6$ .

(b) On the grid, mark each point which satisfies this condition with a cross ( $\times$ ). (2)

(c) Write down the smallest and greatest value of  $(x + y)$  for these points. (2)

Answers (c) Smallest value = .....

Greatest value = .....

(Total 5 marks)

Q26



27. The operation  $a * b$  is defined as

$$a * b = a + b \text{ when } a + b < 4$$

or

$$a * b = a + b - 4 \text{ when } a + b \geq 4.$$

(a) Complete the following table.

		$b$			
		0	1	2	3
$a$	0	0			3
	1	1	2		
	2	2		0	
	3	3	0		

(2)

Hence solve

(b)  $x * x = x,$

(1)

(c)  $x * x = 2,$

(1)

(d)  $(2 * x) * 3 = 2.$

(2)

Answers (b)  $x =$  .....

(c)  $x =$  .....

(d)  $x =$  .....

Q27

(Total 6 marks)





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28. A coin is biased so that the probability of throwing a tail is  $\frac{1}{5}$ .

The coin is to be tossed three times.

Calculate the probability of

(a) throwing two heads followed by one tail,

(3)

(b) throwing two tails and one head in any order.

(3)

Answers (a) .....

(b) .....

(Total 6 marks)

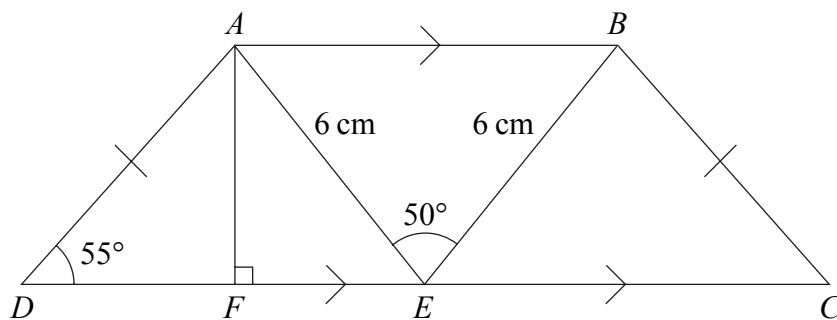
Q28

17

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29.



$ABCD$  is a trapezium with  $AB$  parallel to  $DC$ , and  $AD = BC$ . The point  $E$  lies on  $DC$  such that  $AE = BE = 6$  cm, and the point  $F$  lies on  $DC$  such that  $AF$  is perpendicular to  $DC$ . Given that  $\angle AEB = 50^\circ$  and  $\angle ADC = 55^\circ$ , calculate, to 3 significant figures,

- (a) the length, in cm, of  $AF$ , (2)
- (b) the length, in cm, of  $AD$ , (2)
- (c) the area, in  $\text{cm}^2$ , of  $ABCD$ . (3)

Answers (a) ..... cm

(b) ..... cm

(c) .....  $\text{cm}^2$

(Total 7 marks)

Q29

**TOTAL FOR PAPER: 100 MARKS**

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