# SECONDARY SCHOOLS ANNUAL EXAMINATIONS – 2003
Educational Assessment Unit – Education Division.

**FORM 5**      **MATHEMATICS (Non Calculator Paper)**      **Time: 20 minutes**

Name _____      Class _____

Mark

ANSWER ALL QUESTIONS. THERE ARE 20 QUESTIONS TO ANSWER.

EACH QUESTION CARRIES 1 MARK.

CALCULATORS, RULERS, PROTRACTORS AND OTHER MATHEMATICAL INSTRUMENTS ARE NOT ALLOWED.

ON YOUR DESK YOU SHOULD HAVE NOTHING EXCEPT FOR PEN, PENCIL AND EXAMINATION PAPER.

TO ANSWER QUESTIONS INVOLVING NUMERICAL CALCULATIONS YOU ARE ADVISED TO CHOOSE AND USE THE MORE EFFICIENT TECHNIQUES (MENTAL OR PENCIL-AND-PAPER).

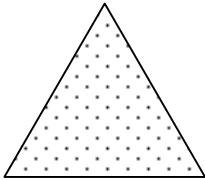YOU ARE NOT REQUIRED TO SHOW YOUR WORKING. HOWEVER SPACE FOR WORKING IS PROVIDED IF YOU NEED IT.
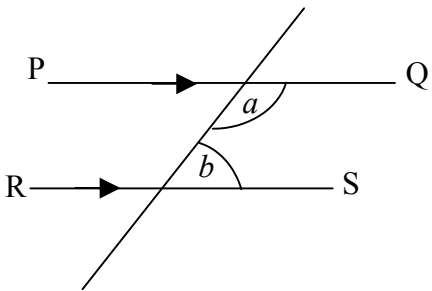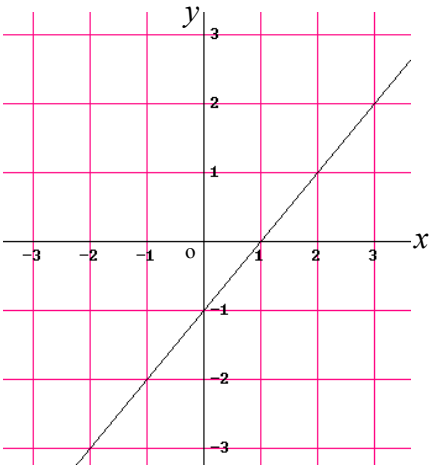
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SPACE

| No. | QUESTION | SPACE FOR WORKING (IF REQUIRED) |
|---|---|---|
| 1. | **43 × 87** gives the same result as:<br><br>A)  43 × 8 + 43 × 7        B)  43 × 70 + 43 × 8<br><br>C)  43 × 80 + 43 × 7        D)  4 × 8 + 3 × 7.<br><br>Ans:_____ | |
| 2. | 1 Euro is approximately 40 cents.  During a holiday in Italy, a Maltese tourist was charged 50 Euros for a traffic offence. What is its equivalence in Malta Lira?<br><br>Ans:_____ | |
| 3. | Paul is facing South.  He turns 90° clockwise.  He will then face:<br><br>A)  North        B)  South        C) East        D)  West.<br><br>Ans:_____ | |
| 4. | $p^{3}$  means the same as:<br>(A) $3 + p$    (B) $p \times p \times p$    (C) $p + p + p$    (D) $3 \times p$.<br><br>Ans:_____ | |
| 5. |   The **perimeter** of an equilateral triangle is 40·5 cm.  What is the length of **one** of its sides?<br><br>Ans: _____ | |
| 6. | Simplify  $3 - 1^{3}/_{8}$.                    Ans:_____ | |
| 7. | A tangent and a radius of a circle meet at an angle of:<br>A)  30º        B) 60º        C) 90º        D) 180º.<br><br>Ans:_____ | |
| 8. | The capacity of a cylindrical beaker is 2 litres**.** How many **millilitres** of water does it hold when it is 75% full?<br><br>Ans:_____ | |

| No. | QUESTION | SPACE FOR WORKING (IF REQUIRED) |
|---|---|---|
| 9. | Denise uses the following LOGO commands:<br><br>**PD REPEAT 360 [ FD 1 RT 1 ]**<br><br>Make a sketch of what the turtle will draw.<br><br>Ans: _____ | |
| 10. | The **area** of a square is 38 cm $^2$.<br>Give an **estimate** for the length of one edge of the square, giving the answer correct to the nearest whole number.<br><br>Ans: _____ | |
| 11. | During a race in France, Jalabert cycled 1·9 kilometres in 3 minutes. Express this as an average **speed** in **km/h.**<br><br>Ans: _____ | |
| 12. | $3 + \,^1/_8$ is equivalent to:<br><br>A) $\dfrac{31}{8}$     B) $\dfrac{1}{38}$     C) $\dfrac{4}{8}$     D) $3\dfrac{1}{8}$.<br><br>Ans: _____ | |
| 13. | **One** CD player and a set of **five** CDs cost Lm 40·00.<br>The **same** CD player and **four** similar CDs cost Lm35·50.<br>What is the cost of **one** CD?<br><br>Ans: _____ | |
| 14. | $\left(\dfrac{2}{3}\right)^{-1}$ simplifies to:<br><br>A) $3^2$     B) $^2/_3$     C) $3^{-2}$     D) $^3/_2$.<br><br>Ans: _____ | |

| No. | QUESTION | SPACE FOR WORKING (IF REQUIRED) |
|---|---|---|
| 15. | Write 0·00058 in standard form.  Ans: _____ | |
| 16. | On a spreadsheet:<br>the number in cell **A2** is 250<br>the number in cell **A3** is 15.<br>In cell **A4** there is the formula =**A2−A3\*4**<br>What value is obtained in cell **A4**?  Ans: _____ | |
| 17. | Write down a **fraction** that lies between $^1/_2$ and $^7/_8$.<br><br>Ans: _____ | |
| 18. | A **cylinder** has a base radius of 6 cm. Its height is 20 cm.<br>The **curved surface area** of the cylinder is approximately:<br><br>A) 360 cm$^2$  B) 720 cm$^2$  C) 2160 cm$^2$  D) 4320 cm$^2$.<br><br>Ans: _____ | |
| 19. |  PQ and RS are two parallel lines. What is the size of angle *b,* when $a = 128°$ ?<br><br>Ans: _____ | |
| 20. |  This is the graph of the line $y = x - 1$ as shown on a computer screen.<br><br>On the same graph, sketch the line of $y = x + 1$. | |

| FORM 5 | | | | | | | MATHEMATICS (Main Paper) | | | | | | | TIME: 1h 40 min | |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | TOTAL MAIN | NON CALCULATOR | GLOBAL MARK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |   |   |    |    |    |    |   |   |   |

## DO NOT WRITE ABOVE THIS LINE

Name _____     Class _____

1.  Change

    a)  Lm2·75 to cents                                   _____ c _____

    b)  260 minutes to hours and minutes        _____ h _____ min _____

    c)  280 000 cm$^2$ to m$^2$.                          _____ m$^2$ _____

                                                                                    (4 marks)

2.  a)
    (i)  Evaluate   $3^0 + 3^2 + 3^{-1}$.        (ii) Simplify   $y^3 \times y^5 \div y^4$.

    b)  A map is drawn to a scale of 1:50 000. A line on the map of length 4·5 cm represents a road between two towns P and Q. What is the actual distance between these two towns? Give your answer in kilometres.

                                                                                    (6 marks)

3.  a) (i)  Write the following numbers correct to **1 significant figure** to give an **estimate** for **Q.**

$$Q = \left( \frac{28.85 + 40.92}{6.82} \right)^3.$$

(ii)  Use your calculator to work out the value of **Q**. Give your answer correct to the nearest whole number.

b)  Simplify:  $( 3\frac{1}{2} + 1\frac{3}{8} ) \div 6\frac{1}{2}.$

(6 marks)

4.  One exterior angle of a regular polygon is 45º. Work out:
    a) the number of sides of the polygon
    b) the size of **one** interior angle of the polygon
    c) the **sum** of all interior angles of the polygon.

(6 marks)

5.  A factory operator works 40 hours a week. He earns Lm2·30 per hour. The overtime rate is 1☐ times the normal rate per hour. Last week he worked a **total** of 48 hours.
    Some of this information is given in the spreadsheet shown below.

| | A | B |
|---|---|---|
| 1 | Normal payment rate per hour ( in Lm) | 2·30 |
| 2 | Normal number of hours per week | 40 |
| 3 | Number of overtime hours in a week | 8 |
| 4 | Normal pay in a week ( in Lm) | |
| 5 | Overtime payment rate per hour ( in Lm ) | |
| 6 | Overtime pay in a week ( in Lm ) | |
| 7 | **Total** weekly payment including overtime ( in Lm) | |

List of formulae
= **B4** + **B6**
= 1·5 * **B1**
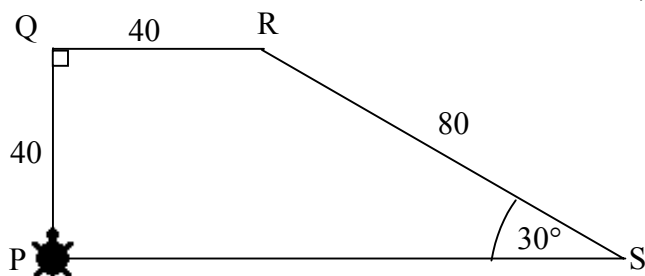= **B1** * **B2**
= **B3** * **B5**

a)  Write down the formula you would use in cell:

**B4**_____ ; **B5**_____ ; **B6**_____ ; **B7**_____

b)  In a certain week, the operator worked 10 hours **overtime**.
    How much did he earn on **overtime** during this particular week?

(6 marks)

6.

Q ⎯⎯ 40 ⎯⎯ R

40

P

80

30° S

a) The trapezium PQRS is the path traced out by the LOGO turtle. QR is parallel to PS. PQ = QR = 40 turtle steps, RS = 80 turtle steps and ∠ PSR = 30°.
Work out the length of PS, in turtle steps, giving the answer correct to the nearest whole number.

b) (i) Complete this set of LOGO commands given to the turtle to draw the trapezium PQRS. (The turtle started at point P as shown).

**PD FD 40 RT 90 FD 40 RT _____ FD 80 HOME**

(ii) How many turtle steps did the turtle travel to trace out the trapezium PQRS? Give the answer correct to the nearest whole number.

(6 marks)

7. a) The curved surface area ($S$) of a cylinder is given by the formula $S = 2\pi rh$.
   (i) Make $h$ the subject of the formula.

   (ii) Work out, to the nearest cm, the value of $h$ when $S = 220$ cm$^2$ and $r = 5$ cm.

   b) Solve the equation $\dfrac{x}{2} = x - 6$.

(5 marks)

8. **Use ruler and compasses only. All construction lines and arcs must be clearly shown.**

   a) Construct an **equilateral triangle** ABC of side 8 cm. Take BC as its base.
   b) Bisect the side AB.
   c) Bisect also angle ABC.
   d) These two bisectors meet at P. Draw a circle with centre P and radius PB.
   e) Measure and write down the length of the radius of this circle.
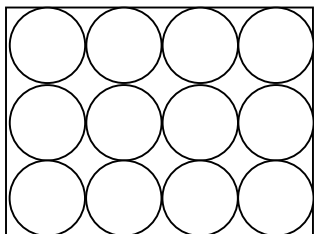
B
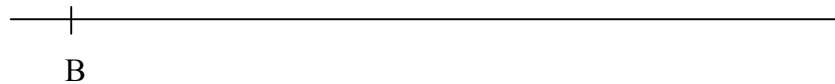
(5 marks)

9. O is the centre of a circle of radius 13 cm. AB and CD are two **equal** chords each of length 24 cm. M and N are the **mid-points** of AB and CD respectively.
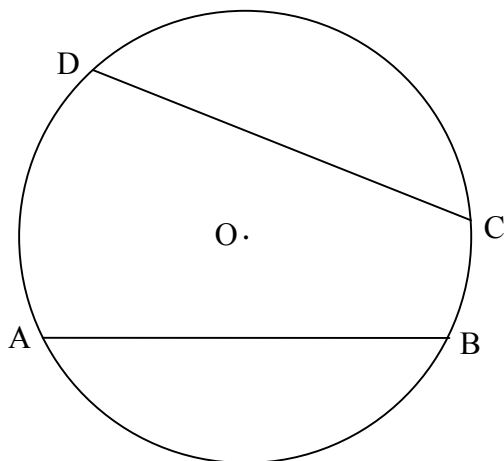
   a) What is the size of angle OMB?

   b) Work out the length of OM.

   c) Underline the correct statement:

   (i) OM is longer than ON      (ii) OM equals ON      (iii) OM is shorter than ON.

(5 marks)

10.



Twelve cylindrical cans of equal size are placed in a rectangular box. The diagram shows their arrangement as seen from above. The cans **just fit** into the box. Each can has a diameter of 8 cm and a height of 16 cm. Work out:
a) the length, breadth and height of the box
b) the volume of the box
c) the **total** volume of the 12 cans correct to the nearest cm$^3$
d) the volume of all the cans as a **percentage** of the volume of the box. Give the answer correct to 1 decimal place.

(8 marks)

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11.  a) The bearing of P from Q is 212°. The distance PQ is 35 km. Work out:
     (i)   the bearing of Q from P giving the answer as a three figure bearing
     (ii)  the distance PR giving the answer correct to 3 significant figures.
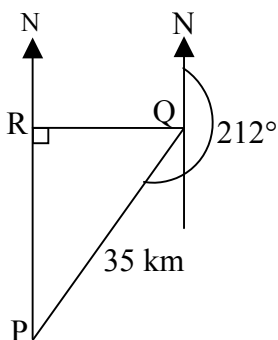


b) Twenty cards were numbered from 1 to 20 as shown below.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
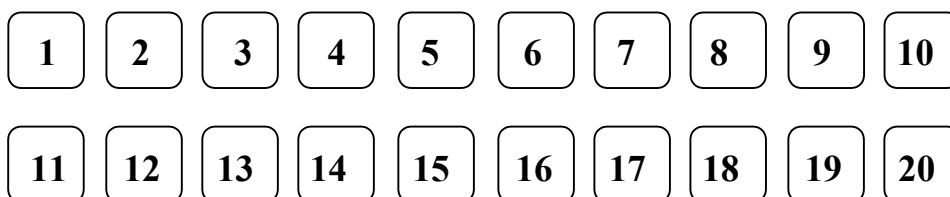
The cards were placed face down on a table in a random order.
Marica picked a card at random. Work out the probability that the card showed:

(i)   a **prime** number  _____         (ii) **NOT** a **prime** number  _____

(iii) a **multiple of 3**  _____         (iv) a number which is a **multiple of 3** and **also** a **prime** number.  _____

(8 marks)

12. A group of 90 children were asked which drink they preferred for breakfast.
The following table shows the results obtained:

| Type of drink | Number of children | Angle on pie chart |
|---|---|---|
| Coffee | 10 | |
| Tea | 12 | 48° |
| Drinking Chocolate | 20 | 80° |
| Milkshake | 18 | |
| Juice | | |

a) Fill in the missing spaces in the table.

b) Complete the pie chart to show all the information.
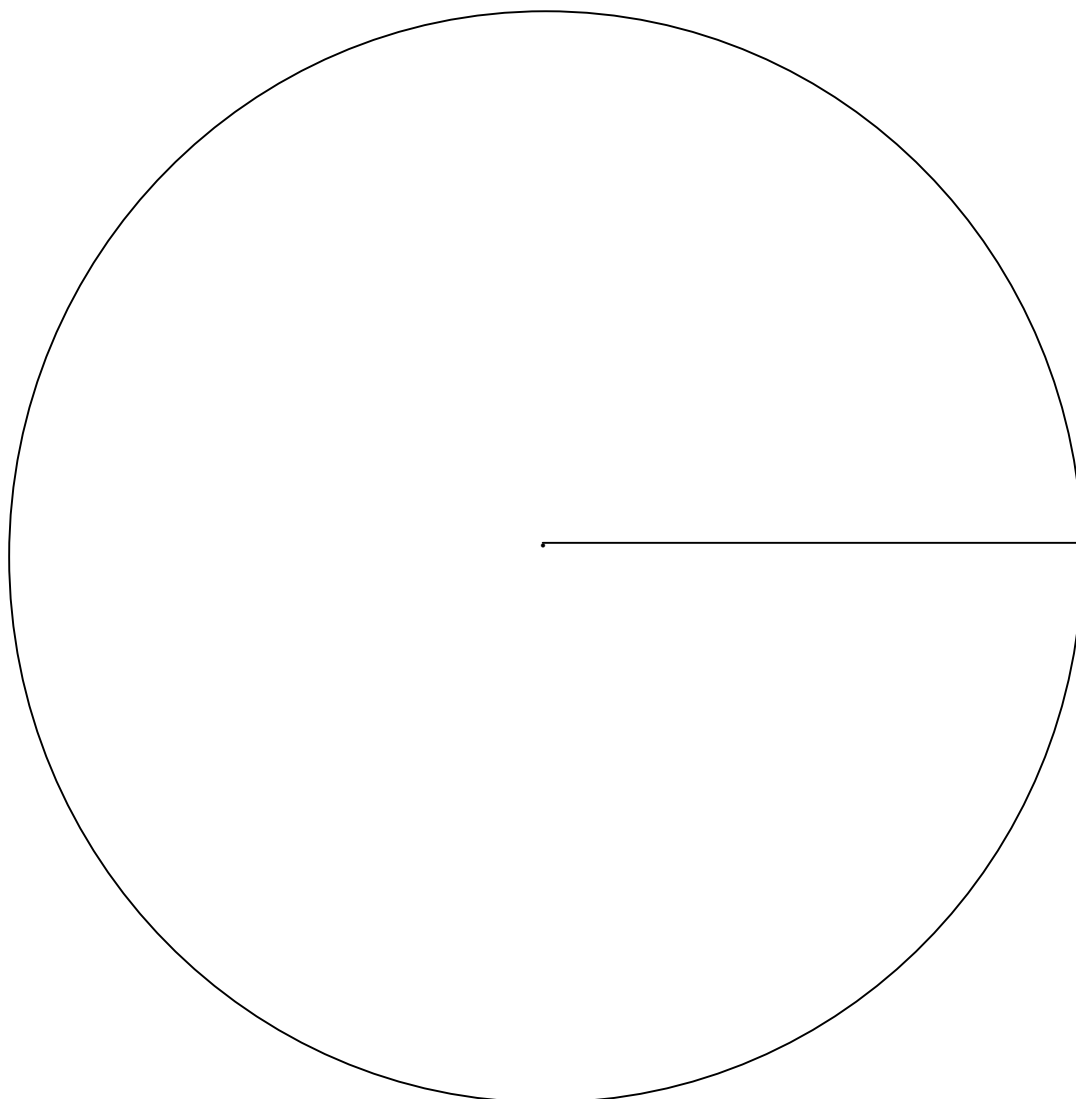


(8 marks)

13.

On the given grid:

a) **Plot** and **join** the points A (1,2)  B (3,2)  C (3,5) and D (1,5).

b) **Reflect** ABCD in the *y*-axis and label the image A′B′C′D′.

c) **Enlarge** A′B′C′D′ by a scale factor of 2 about the point (0,0) and label the image A″B″C″D″.

d) Write down, **in the simplest form**, the ratio of the lengths of the diagonals

BD **:** B″D″ = ☐ **:** ☐ .

e) **Translate** A″B″C″D″  by the vector $\begin{pmatrix} 8 \\ 5 \end{pmatrix}$ and label the image T.
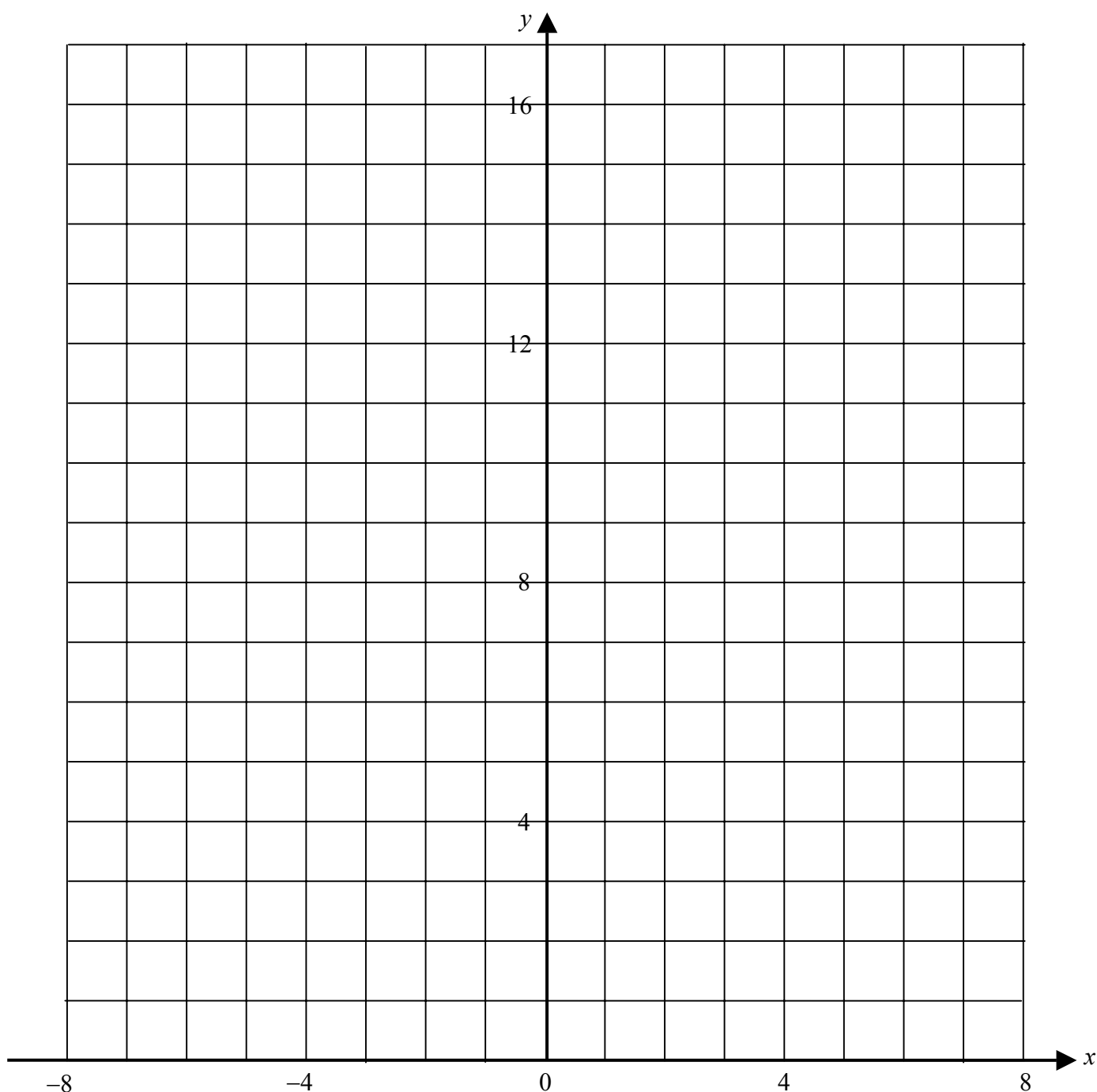


(7 marks)

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