EXAMINATIONS COUNCIL OF ESWATINI
Junior Certificate Examination

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

ADDITIONAL MATHEMATICS **519**

October/November 2025

2 hours 30 minutes

Candidates answer on the Question Paper.
Additional materials: Scientific calculator
Geometrical instruments

READ THESE INSTRUCTIONS FIRST

Write your centre number, candidate number and name in the spaces provided.
Write in dark blue or black pen in the spaces provided on the Question Paper.
You may use an HB pencil for any diagrams or graphs or rough working.
Do not use staples, paperclips, highlighters, and glue or correction fluid.

Answer **all** questions.

All working should be clearly shown below that question.
The number of marks is given in brackets [ ] at the end of each question or part question.

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 3.14 or your calculator value.
The total marks for this paper is 100.

For Examiner's Use	
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This document consists of **19** printed pages and **1** blank page.

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[Turn over

1 You are given the matrices.

$$K = (2 \quad 7) \qquad P = \begin{pmatrix} 1 & 2 & -3 \\ -4 & 5 & 6 \end{pmatrix} \qquad R = \begin{pmatrix} -7 & -8 & 9 \\ -10 & 11 & -12 \end{pmatrix} \qquad Q = \begin{pmatrix} 3 \\ -4 \end{pmatrix}$$

(a) Write down the order of matrix P.

Answer (a) ……..……..... [1]

(b) Work out P – R.

Answer (b) ……..…… [2]

(c) By multiplication, show that $KQ \neq QK$.

Answer (c) ……..... [3]

2 Work out.

$$\begin{pmatrix} -1 & 2 \\ 3 & 5 \end{pmatrix}^2$$

Answer ……...……...…… [2]

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3 Explain why it is not possible to work out the following.

(a) $\begin{pmatrix} 3 \\ 7 \end{pmatrix}\begin{pmatrix} 2 \\ 4 \end{pmatrix}$

……

…… [1]

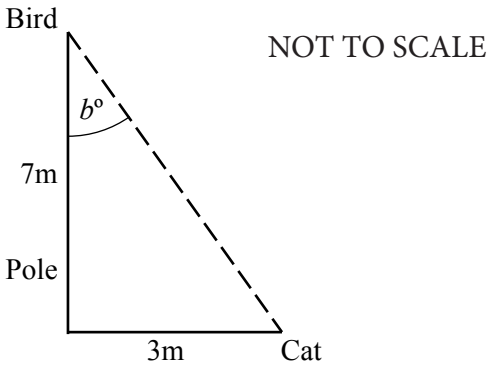
(b) $(3 \quad 4 \quad 5) + \begin{pmatrix} 6 \\ 9 \\ 10 \end{pmatrix}$

……

…… [1]

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4 A cat is 3 meters away from a flag pole.
The flag pole is 7 meters tall.
A bird is sitting on the top of the flag pole.



(a) Calculate the angle of depression of the cat from the bird.

Answer (a) ……..° [2]

(b) Calculate the direct distance of the cat from the bird.

Answer (b) ……m [2]

(c) Write down the value of tan b°.

Answer (c) …… [1]

5 You are given that $\overrightarrow{DC} = \begin{pmatrix} 4 \\ -4 \end{pmatrix}$.

(a) Find $|\overrightarrow{DC}|$.

Answer (a) ……...……[3]

(b) You are also given that $\overrightarrow{OK}$ $\begin{pmatrix} -12 \\ 12 \end{pmatrix}$.

Show that $\overrightarrow{DC}$ is parallel to $\overrightarrow{OK}$.

……...…

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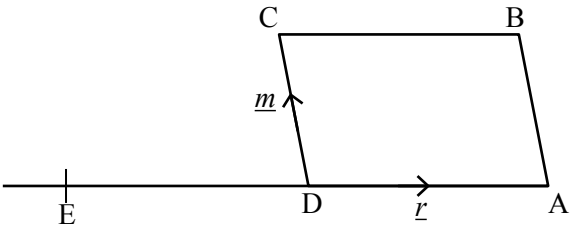
……...…

…….. [2]

6 The point D is the midpoint of EA.
$ABCD$ is a parallelogram.

$\overrightarrow{DA} = \underline{r}$.

$\overrightarrow{DC} = \underline{m}$.



Express the following vectors in terms of $\underline{m}$ and or $\underline{r}$.

(a) $\overrightarrow{AC}$

Answer (a) ……..…….. [1]

(b) $\overrightarrow{BE}$

Answer (b) ……...…… [2]

(c) Express vector $\overrightarrow{EA}$ in terms of vector $\overrightarrow{CB}$.

Answer (c) ……..…….. [1]

(d) State the name of the shape $ECBA$.

……..…… [1]

(e) Complete the statement

EC + ... + $BA = EA$. [1]

7 Given that

$$\begin{pmatrix} 2 & 3 \\ x & 4 \end{pmatrix}\begin{pmatrix} 7 & y \\ 2 & 4 \end{pmatrix}=\begin{pmatrix} 20 & 14 \\ 43 & 21 \end{pmatrix}$$

Work out for the values of x and y.

Answer x =…… , y = ……..….. [3]

8 Solve.

(a) $\frac{x+5}{5} - \frac{2x-6}{3} = 10$

Answer (a) $x =$ ……..…..…….. [3]

(b) $x^2 - 12 = x$

Answer (b) $x =$ ……..……..……. [4]

(c) $\frac{7-3x}{6} \geq 5$

Answer (c) ……..…… [3]

(d) $7m - k = -13$

$3k = 2m + 1$

Answer (d) $m =$ ……..… , $k =$ ……..…….. [3]

9 Remove brackets and simplify.

(a) $-x(3kx - 4x^2 p)$

Answer (a) ……..…… [1]

(b) $(x - 5)^2$

Answer (b) ……..…… [3]

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10 Simplify.

$$\frac{14}{p-6} + \frac{3}{p-2}$$

Answer …….. [3]

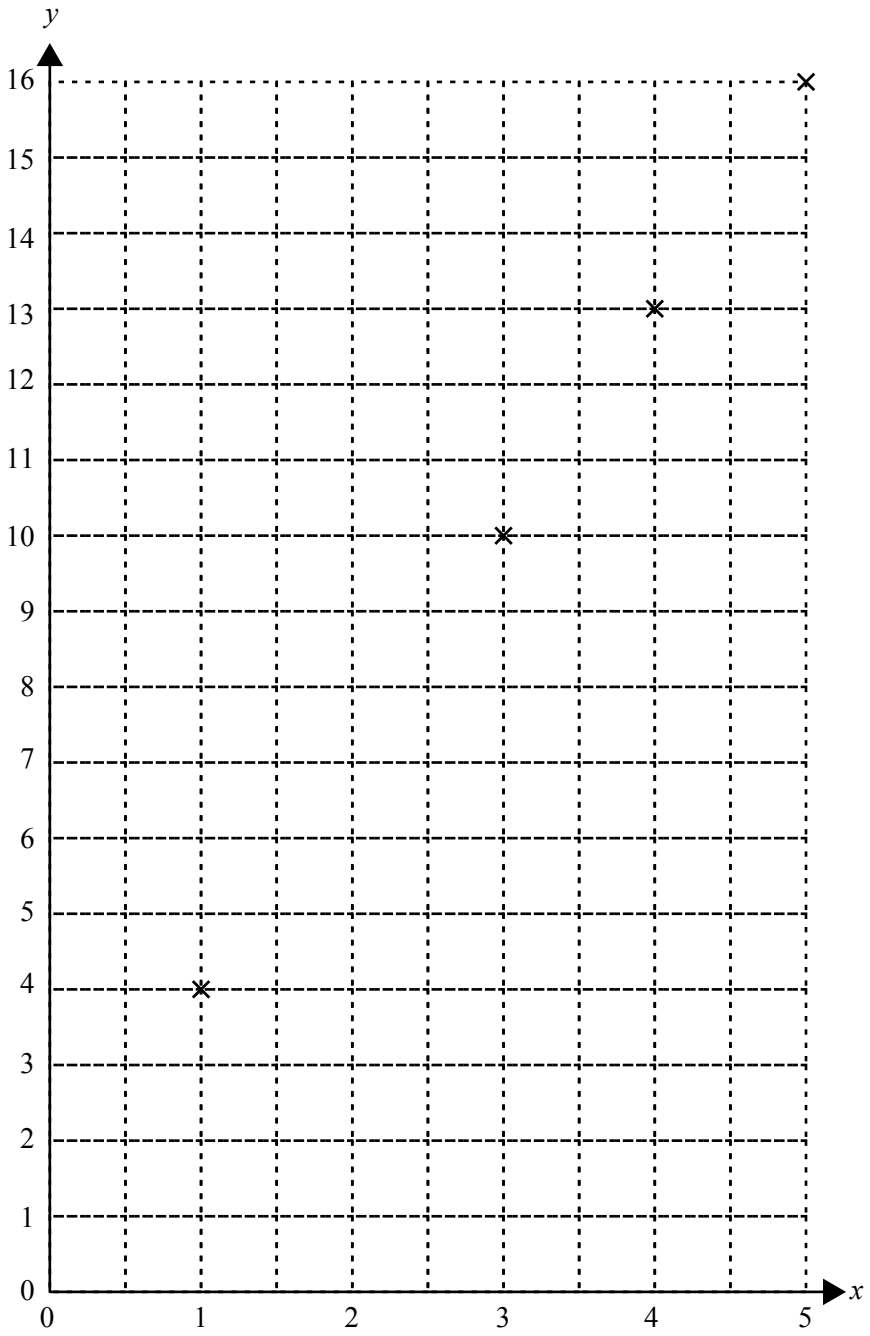
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11 You are given that $5r^2 = 7 - \frac{r^2 - 3}{k}$.

Make r the subject of the formula.

Answer ..... [4]

12 The four plotted points represent ordered pairs of a function.



(a) (i) List the domain and range for the function.

Answer (a)(i) domain = ……..…… Range ……...…..……..….. [2]

(ii) State the type of a relation represented by the ordered pairs above.

Answer (a)(ii) ……..... [1]

(iii) Describe the function represented by the ordered pairs using function notation.

Answer (a)(iii) ……..... [2]

(b) Given that $G(p) = 5 - 3p$ and $H(p) = 2p + 4$

Find

(i) $G(-2)$,

Answer (b)(i) ……..... [1]

(ii) $H(m)$,

Answer (b)(ii) ……..... [1]

(iii) value of p given that $G(p)=3H(p)$.

Answer (b)(iii) p = ……..…….. [3]

13 (a) Factorize the following expressions.

(i) $8 - 2b^2$

Answer (a)(i) ……...……..…… [2]

(ii) $x^2 - 10x - 75$

Answer (a)(ii) ……...…… [2]

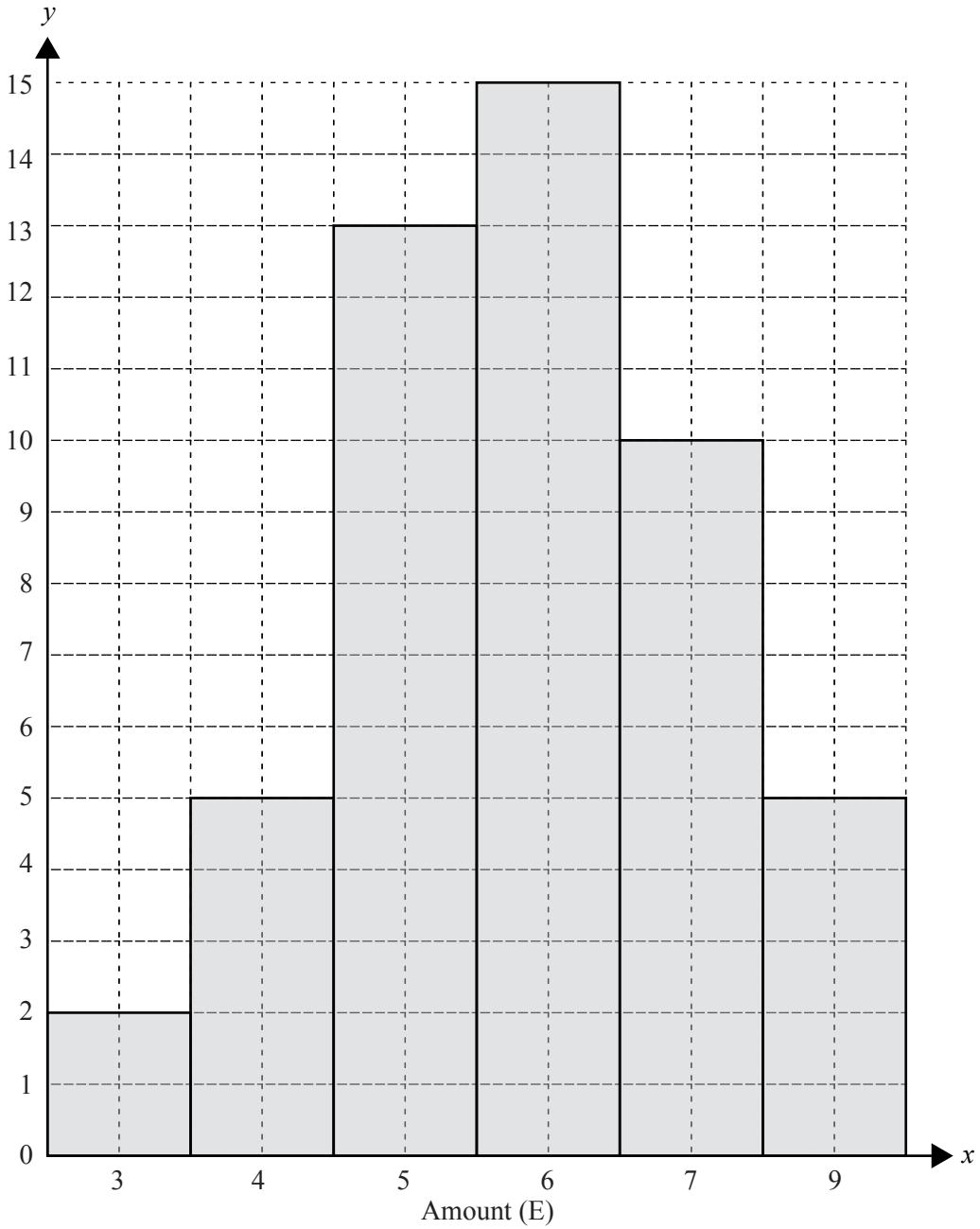
(b) Work out by **factorisation**.

Show **all** your working.

$63^2 - 37^2$

Answer(b) ……... [2]

14 The bar chart shows the amount of pocket money for grade 2 learners in a school on a particular day.



(a) (i) Find the number of learners in this class.

Answer (a)(i) ……..…….. [2]

(ii) Write down the mode.

Answer (a)(ii) ……..……..... [1]

(iii) Calculate the probability that the learner carried E7 or more.

Answer (a)(iii) ……....…….. [2]

(iv) State the probability that a learner carried E8.

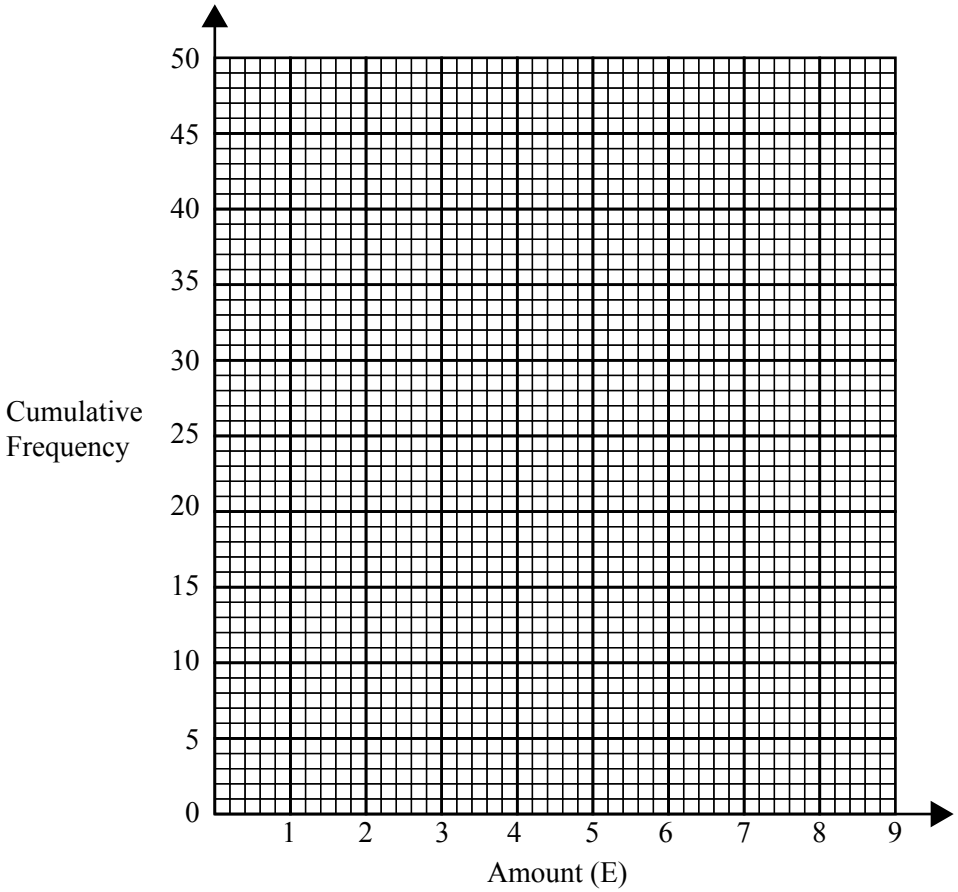
Answer (a)(iv) ……....…….. [1]

(b) (i) Complete the cumulative table.

Amount (Emalangeni)	Frequency	Cumulative frequency
3	2	
4		7
5		
6	15	35
7	10	
9	5	

[3]

(ii) Draw a cumulative frequency curve for the above data.



[3]

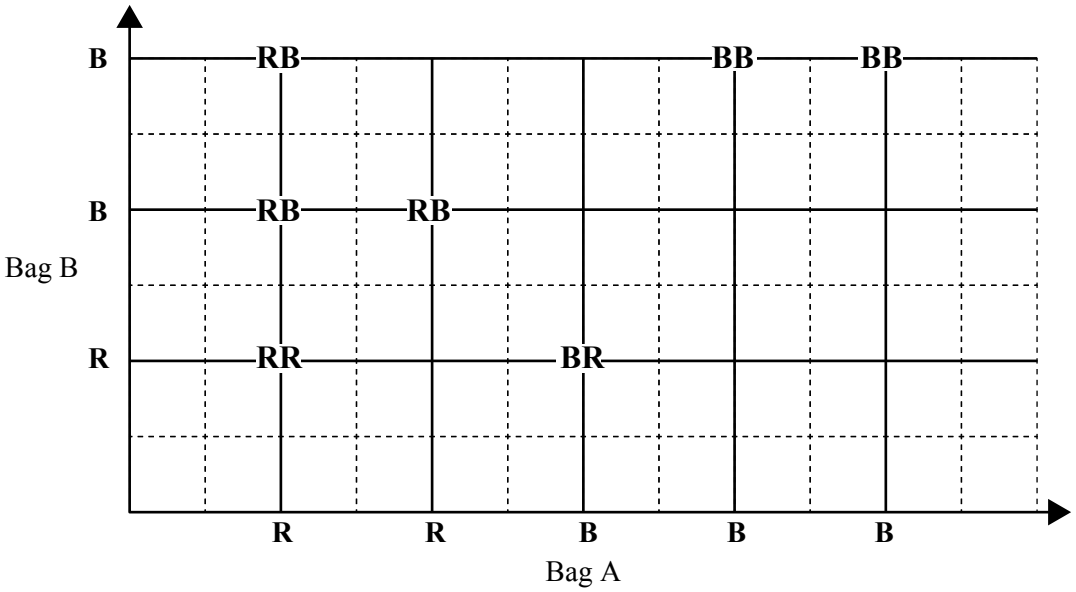
(c) Use the graph to estimate the median.

Answer (c) ..... [2]

15 Mrs K has two bags.
Bag A contains 2 red balls and 3 blue balls.
Bag B contains 1 red ball and 2 blue balls.

(a) A ball is chosen at random from each bag.
Some combinations are shown in the possibility space diagram.

Complete the possibility space diagram to show the missing outcomes.



[2]

(b) Find the probability that

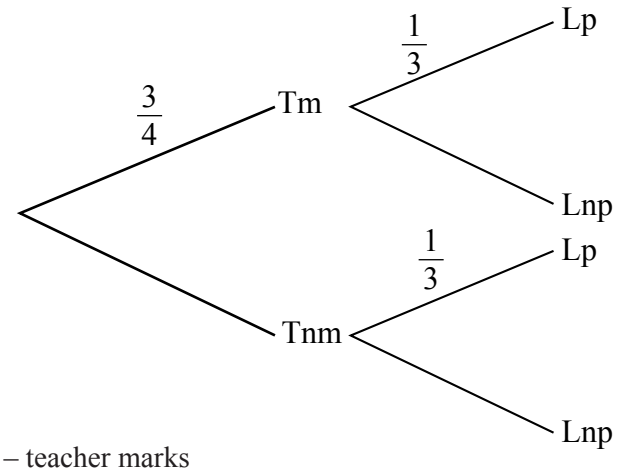
(i) Both balls are of the same colour.

Answer (b)(i) ……..…… [1]

(ii) At least one ball is blue.

Answer (b)(ii) ……....…….... [2]

16 The probability that a teacher marks a test within 2 days is $\frac{3}{4}$.
The probability that the learners are ready to discuss the test within 2 days is $\frac{1}{3}$.
The above information is represented in a tree diagram, as shown below.



KEY: Tm – teacher marks
Tnm – teacher does not mark
Lp – learners prepared
Lnp – learners not prepared.

(a) Fill in the missing probabilities in the tree diagram [2]

(b) Calculate the probability that the teacher marks within 2 days and find the learners prepared for discussion.

Answer (b) ……..…….. [1]

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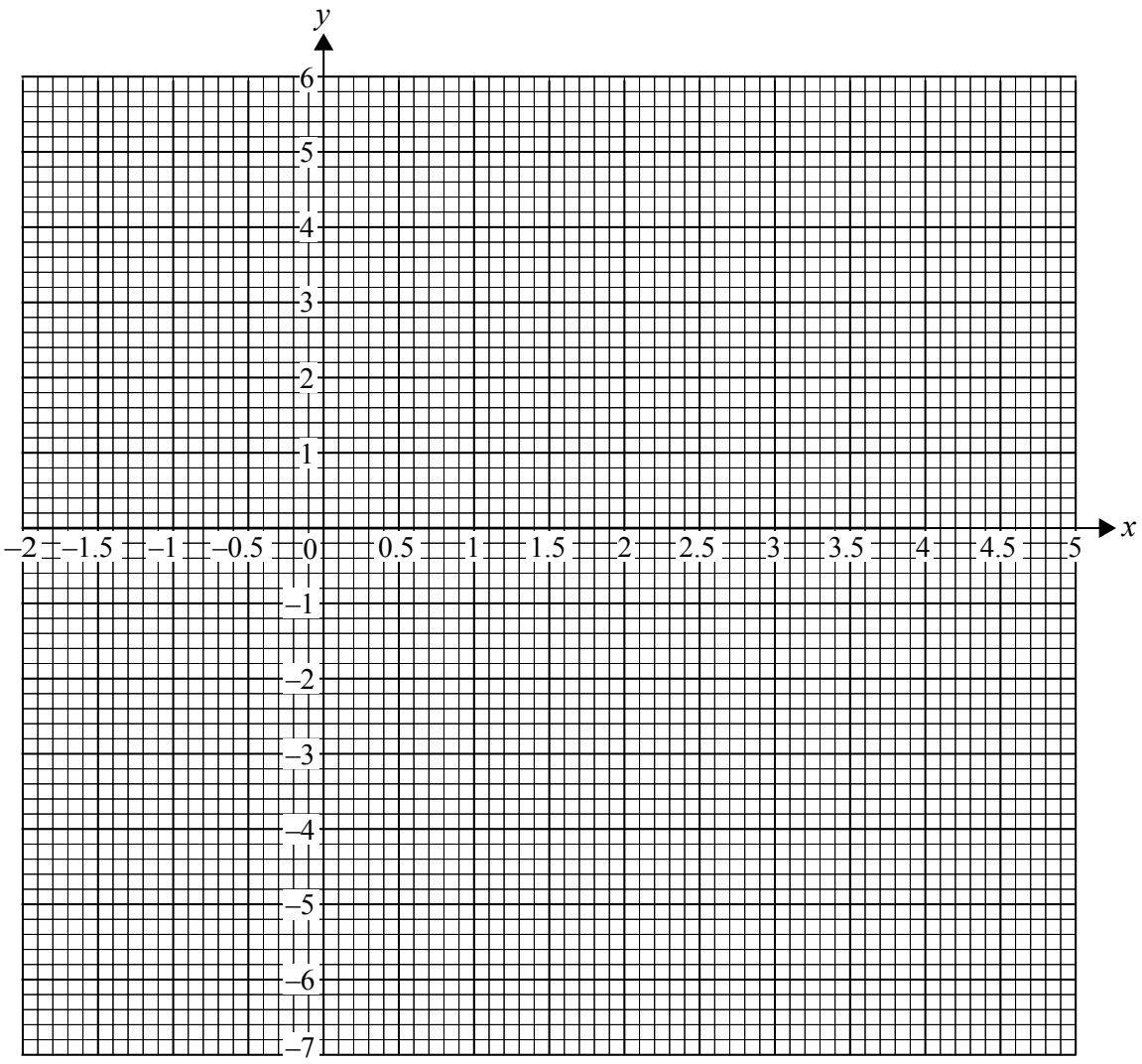
17 The table below connect the values of x and values of y by the equation
$y = (x - 4)(x + 1)$

x	–2	–1	0	1	2	3	4	5
$y = (x - 4)(x + 1)$	6	p	–4	–6	–6	–4	0	q

(a) Find the values of p and q.

Answer (a) p = …… , q = …… [2]

(b) Draw the graph of $y = (x - 4)(x + 1)$.



[3]

(c) Find the value of y when $x = 1.5$

Answer (c) y = ……..... [1]

(d) Use the graph to solve $(x - 4)(x + 1) = x - 3$

Answer (d) x = ……..… , *x =* ……..…..…... [3]

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