Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel International GCSE

Centre Number	Candidate Number

Monday 7 January 2019

Morning (Time: 2 hours) | Paper Reference **4MA0/3H**

Mathematics A

Paper 3H
Higher Tier

You must have:
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  – there may be more space than you need.
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
  Anything you write on the formulae page will gain NO credit.

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets
  – use this as a guide as to how much time to spend on each question.

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Turn over ▶

P55642A

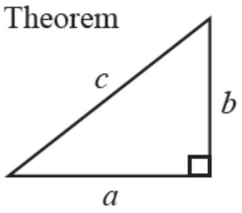
5/3/6/

P 5 5 6 4 2 A 0 1 2 4

Pearson

International GCSE MATHEMATICS
FORMULAE SHEET – HIGHER TIER

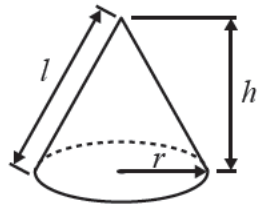
Pythagoras' Theorem



$a^2 + b^2 = c^2$

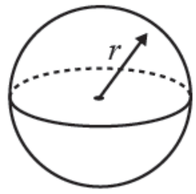
Volume of cone $= \frac{1}{3}\pi r^2 h$

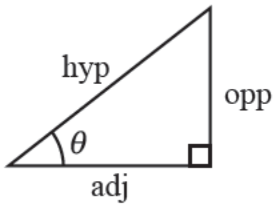
Curved surface area of cone $= \pi r l$



Volume of sphere $= \frac{4}{3}\pi r^3$

Surface area of sphere $= 4\pi r^2$





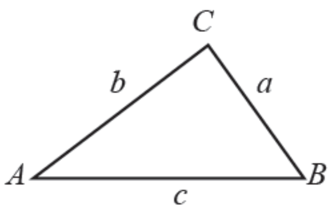
adj = hyp × cos θ
opp = hyp × sin θ
opp = adj × tan θ

or $\sin\theta = \dfrac{\text{opp}}{\text{hyp}}$

$\cos\theta = \dfrac{\text{adj}}{\text{hyp}}$

$\tan\theta = \dfrac{\text{opp}}{\text{adj}}$

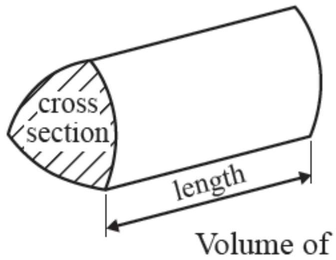
In any triangle ABC



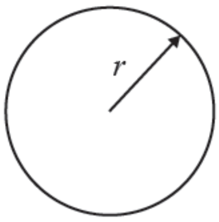
Sine rule: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

Cosine rule: $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle $= \frac{1}{2} ab \sin C$



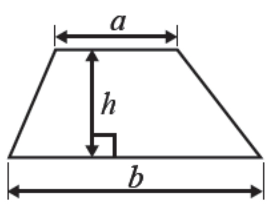
Volume of prism = area of cross section × length

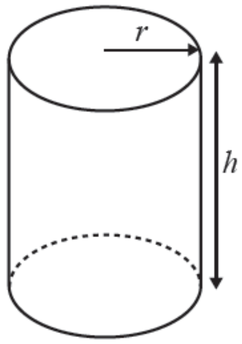


Circumference of circle $= 2\pi r$

Area of circle $= \pi r^2$

Area of a trapezium $= \frac{1}{2}(a + b)h$





Volume of cylinder $= \pi r^2 h$

Curved surface area of cylinder $= 2\pi r h$

The Quadratic Equation
The solutions of $ax^2 + bx + c = 0$,
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Answer ALL TWENTY FOUR questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Jerry drove 315 kilometres from London to Leeds.
His average speed was 75 km/h.

Work out how long it took Jerry to drive from London to Leeds.
Give your answer in hours and minutes.

hours minutes

(Total for Question 1 is 3 marks)

---

2 Point A has coordinates $(4, -1)$
Point B has coordinates $(9, 7)$

Work out the coordinates of the midpoint of the line AB.

(,)

(Total for Question 2 is 2 marks)

---

3 $\mathscr{E}$ = {whole numbers from 3 to 18}
$A = \{3, 6, 9, 18\}$
$B = \{3, 6, 9, 12, 15\}$
$C = \{6, 12, 18\}$

(a) List the members of the set

(i) $A \cap B$

(ii) $A \cup C$

(2)

Sasha writes down

$12 \notin A$

(b) Is Sasha correct?

Give a reason for your answer.

(1)

(Total for Question 3 is 3 marks)

---

4 A circle has diameter 18 cm.

Work out the circumference of the circle.
Give your answer correct to 1 decimal place.

cm

(Total for Question 4 is 2 marks)

P 5 5 6 4 2 A 0 4 2 4

5 Josh has 40 counters in a bag.

In the bag, there are

18 red counters
13 blue counters
9 yellow counters

Josh puts some more **red** counters into the bag.

Josh is now going to take at random a counter from the bag.

The probability that he will take a red counter is $\frac{1}{2}$

Work out the probability that he will take a yellow counter.

(Total for Question 5 is 3 marks)

P 5 5 6 4 2 A 0 5 2 4

6 (a) Factorise $y^2 + y$

(1)

(b) Solve $3(m + 7) = 12 - 5m$

Show clear algebraic working.

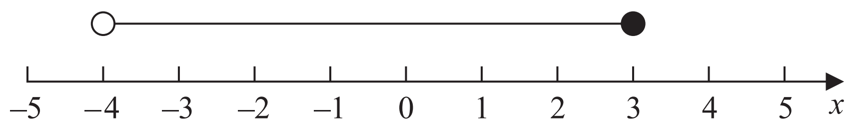
$m =$ ....

(3)

(c) Expand and simplify $(g - 7)(g + 2)$

(2)

(d) Write down the inequality shown on this number line.



(2)

(Total for Question 6 is 8 marks)

7 There are 96 cards on a table.
Each card is either red or black.

The ratio of the number of red cards to the number of black cards is $5:7$

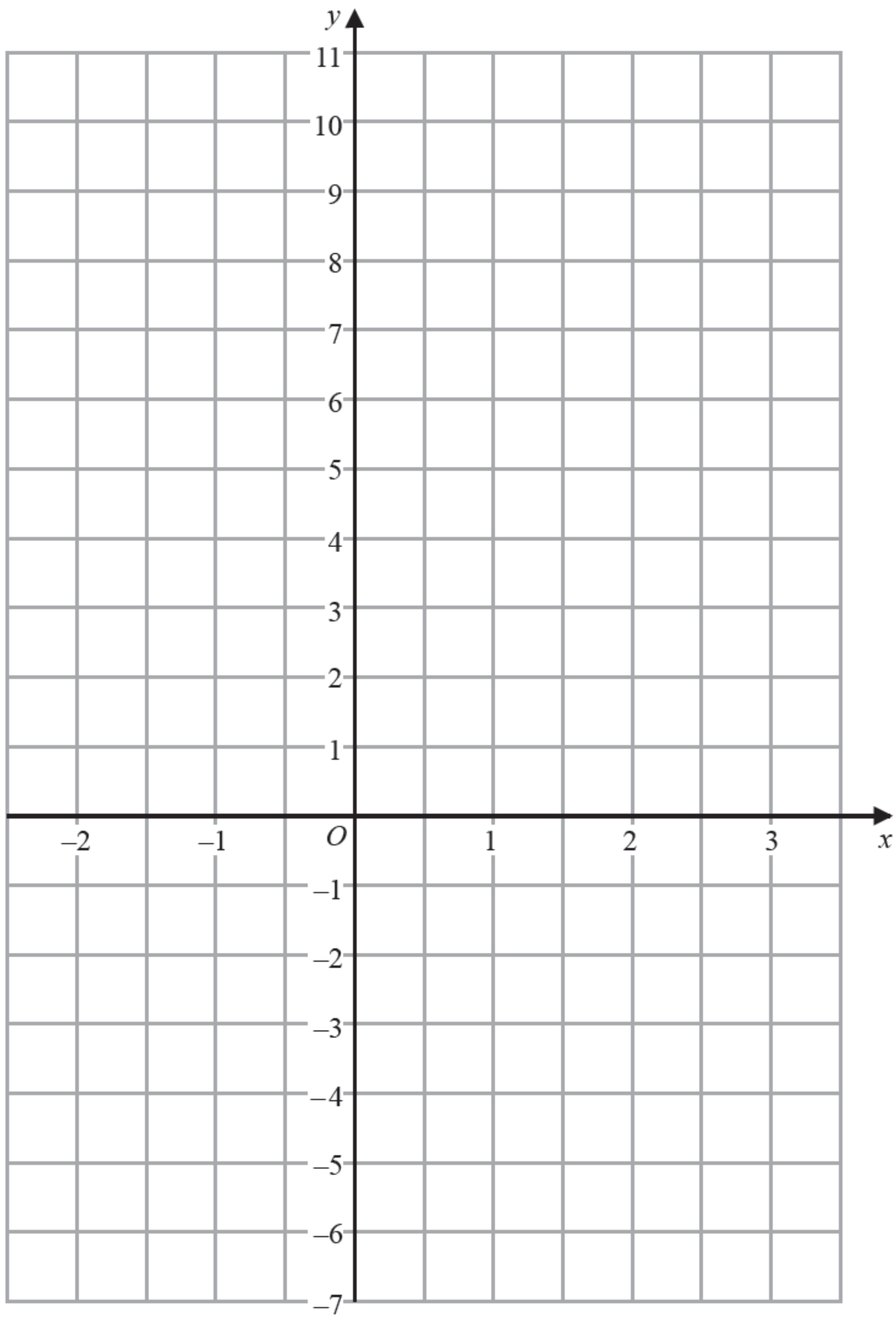
There is a circle on 35% of the red cards.

There is a circle on $\frac{3}{14}$ of the black cards.

On how many of the 96 cards is there a circle?

(Total for Question 7 is 5 marks)

8 On the grid, draw the graph of $y + 3x = 4$ for values of x from −2 to 3



(Total for Question 8 is 3 marks)

9

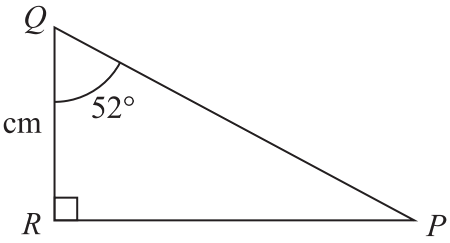


Diagram **NOT** accurately drawn

Work out the length of *RP*.
Give your answer correct to 3 significant figures.

cm

(Total for Question 9 is 3 marks)

---

10 Emily made 6 cakes.
It cost her a total of £7.60 to make the cakes.

Emily sold 2 of the cakes for £3.50 each.
She sold the other 4 cakes for £4.25 each.

Work out Emily's percentage profit.
Give your percentage correct to the nearest whole number.

%

(Total for Question 10 is 4 marks)

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11 Here is a solid prism.

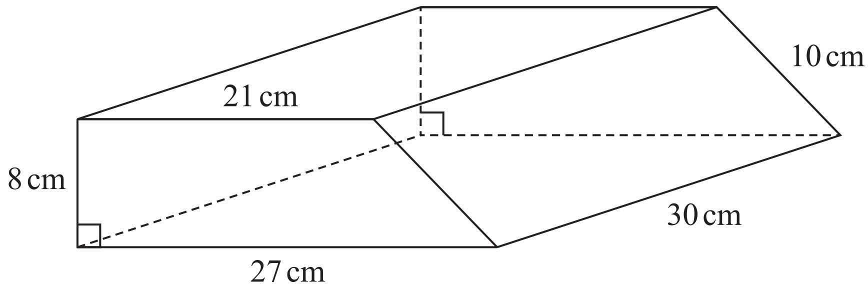


Diagram **NOT** accurately drawn

The cross section of the prism is a trapezium.

Work out the total surface area of the prism.

cm²

(Total for Question 11 is 3 marks)

12 There are 40 children at a kindergarten.
24 of the children are boys and 16 of the children are girls.

The boys have a mean height of 113 cm.
The girls have a mean height of 110 cm.

Calculate the mean height of all 40 children at the kindergarten.

cm

(Total for Question 12 is 3 marks)

---

13 Remi invests 18 000 dirham in a savings account for 3 years.
He gets 1.2% per year compound interest.

How much money will Remi have in his savings account at the end of the 3 years?
Give your answer to the nearest dirham.

dirham

(Total for Question 13 is 3 marks)

14 The grouped frequency table gives information about the distances that 120 people travel to get to work.

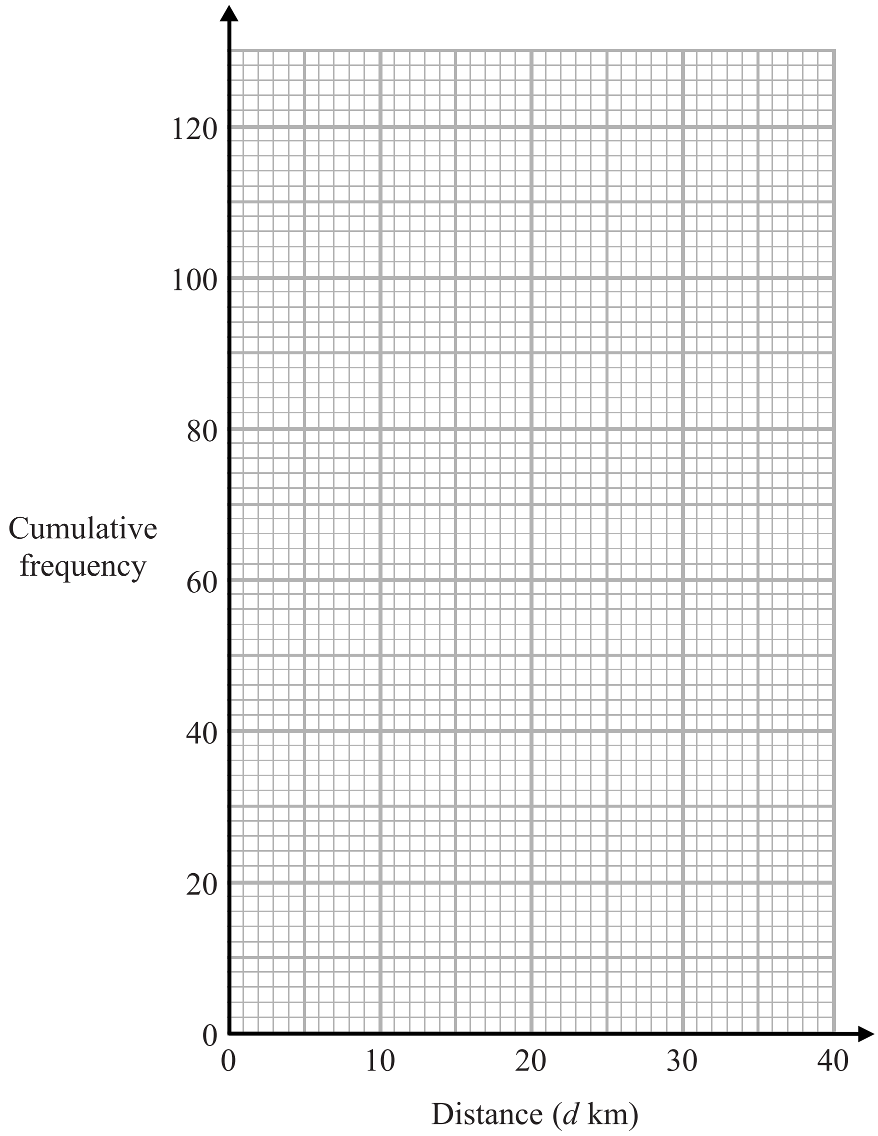
Distance (d km)	**Frequency**
$0 < d \leqslant 5$	8
$5 < d \leqslant 10$	20
$10 < d \leqslant 15$	27
$15 < d \leqslant 20$	29
$20 < d \leqslant 25$	18
$25 < d \leqslant 30$	11
$30 < d \leqslant 35$	7

(a) Complete the cumulative frequency table.

Distance (d km)	**Cumulative frequency**
$0 < d \leqslant 5$	
$0 < d \leqslant 10$	
$0 < d \leqslant 15$	
$0 < d \leqslant 20$	
$0 < d \leqslant 25$	
$0 < d \leqslant 30$	
$0 < d \leqslant 35$	

(1)

(b) On the grid, draw a cumulative frequency graph for your table.



(2)

(c) Use your graph to find an estimate for the interquartile range of the distances travelled.

km

(2)

(Total for Question 14 is 5 marks)

15 (a) Simplify $g^8 \div g^2$

(1)

(b) Simplify $6e^2m^7 \times 3em^4$

(2)

(c) Simplify $(64a^6c^2)^{\frac{1}{2}}$

(2)

(d) Factorise $x^2 - 1$

(1)

(e) Make k the subject of $f = \sqrt{\dfrac{1 - 2k}{3}}$

(3)

(Total for Question 15 is 9 marks)

16 The diagram shows triangle *PQR*.

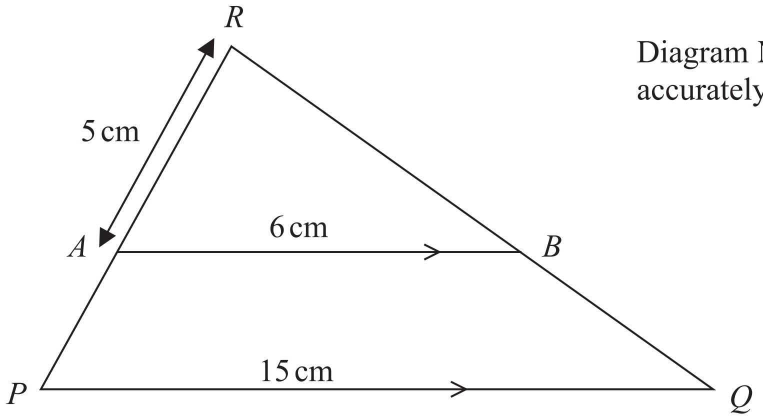


Diagram **NOT** accurately drawn

A is a point on *PR* and *B* is a point on *QR* so that *AB* is parallel to *PQ*.

$AR = 5$ cm
$AB = 6$ cm
$PQ = 15$ cm

(a) Work out the length of *AP*.

.... cm

(3)

Given that the area of triangle *PQR* is 88 cm^2

(b) work out the area of triangle *ARB*.

.... cm^2

(2)

(Total for Question 16 is 5 marks)

P 5 5 6 4 2 A 0 1 5 2 4

17 Use algebra to show that the recurring decimal $0.0\dot{2}\dot{4} = \dfrac{4}{165}$

(Total for Question 17 is 2 marks)

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18 $\mathbf{a} = \begin{pmatrix} -5 \\ 6 \end{pmatrix}$ $\quad \mathbf{b} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$ $\quad \mathbf{c} = \begin{pmatrix} 4 \\ -2 \end{pmatrix}$

(a) Write $2\mathbf{b} - \mathbf{c}$ as a column vector.

(2)

Cho says that the vector $\mathbf{a} - \mathbf{b}$ is parallel to the vector $\mathbf{c}$

(b) Is Cho correct?
Give a reason for your answer.

(2)

(Total for Question 18 is 4 marks)

19 (a) Express $\dfrac{1}{2x+1} - \dfrac{3}{x+5}$ as a single fraction.
Give your answer as simply as possible.

(3)

(b) Solve the inequality $6(x-1)^2 > 24$
Show clear algebraic working.

(4)

(Total for Question 19 is 7 marks)

20

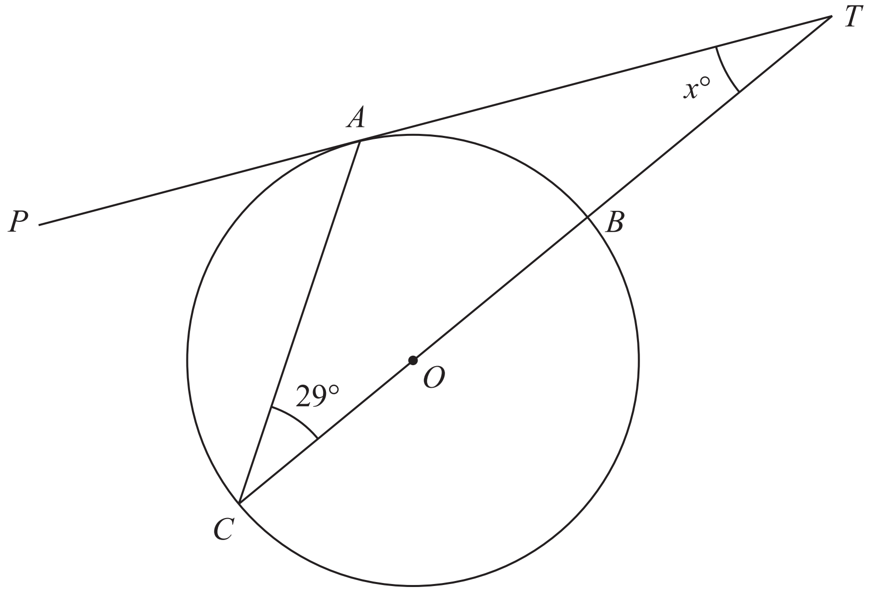


Diagram **NOT** accurately drawn

A, *B* and *C* are points on a circle, centre *O*.
TAP is a tangent to the circle.
TBOC is a straight line.

Angle $ACT = 29°$

Work out the value of *x*.
Give a reason for each stage in your working.

$x =$ ....

(Total for Question 20 is 4 marks)

P 5 5 6 4 2 A 0 1 8 2 4

21 The functions f and g are such that

$$f(x) = \frac{1}{2}x + 3$$

$$g(x) = \frac{14}{2x - 3}$$

(a) Work out f(3)

(1)

(b) State the value of x that cannot be included in any domain of g.

(1)

(c) Solve $f^{-1}(x) = gf(x)$
Show clear algebraic working.

(6)

(Total for Question 21 is 8 marks)

22 The diagram shows a parallelogram *LMNP*.

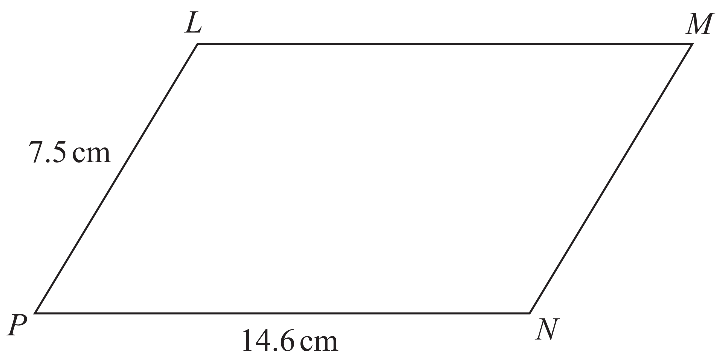


Diagram **NOT** accurately drawn

$LN = 13.3$ cm

Calculate the area of the parallelogram.
Give your answer correct to 3 significant figures.

.... cm^2

(Total for Question 22 is 4 marks)

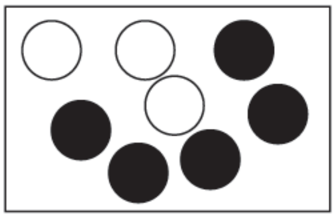
23 $M = \dfrac{b - c}{a}$

$a = 5.3$ correct to 1 decimal place.
$b = 346.6$ correct to 1 decimal place.
$c = 80.0$ correct to 1 decimal place.

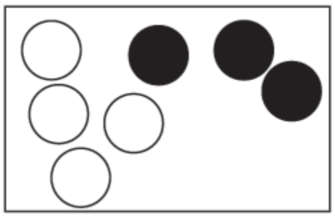
Calculate the upper bound for the value of M.
Show your working clearly.

(Total for Question 23 is 3 marks)

24 There are only 3 white and 5 black counters in box **X**.
There are only 4 white and 3 black counters in box **Y**.



box **X**



box **Y**

Michael takes at random 2 counters from box **X** and puts both counters into box **Y**.
He then takes at random 1 counter from box **Y** and puts this counter into box **X**.

Work out the probability that there is now an equal number of white counters and black counters in box **Y**.

(Total for Question 24 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

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