

Pre Public Examination
November 2016
GCSE Mathematics (AQA style)

Higher Tier
Paper 3H

Name

Class

TIME ALLOWED

1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- You are permitted to use a calculator in this paper.
- Do all rough work in this book.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question on the Question Paper.
- **You are reminded of the need for clear presentation in your answers.**
- The total number of marks for this paper is **80**.

Question	Mark	Out of
1		2
2		2
3		8
4		3
5		2
6		3
7		2
8		6
9		6
10		5
11		4
12		4
13		4
14		5
15		4
16		2
17		4
18		9
19		5
Total		80

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ANSWER IN THE SPACES PROVIDED**

Answer **all** questions in the spaces provided

1 Solve $7x + 2 = 9x - 3$.

[2 marks]

Answer _____

2 Each wheel on Laura's bicycle has a diameter of 70cm.



Laura uses her calculator to work out the circumference of the wheel. She says that the exact circumference of the wheel is 219.91149 cm.

Is she correct?

Tick a box.

Yes

No

Give a reason for your answer.

[2 marks]

- 3 A call-centre worker records the length of the phone calls that he makes in one day. The results are shown in the table below

Length of call (m minutes)	Frequency
$0 < m \leq 2$	5
$2 < m \leq 4$	10
$4 < m \leq 6$	8
$6 < m \leq 8$	3
$8 < m \leq 100$	6
$100 < m \leq 120$	2

- 3 (a) Calculate an estimate of the median length of a call.

[3 marks]

Answer _____

- 3 (b) Calculate an estimate of the mean length of a call.

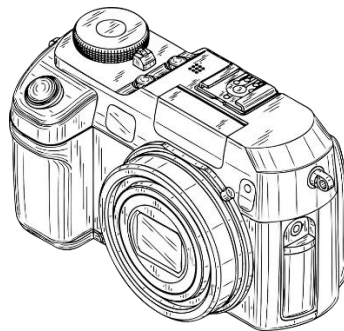
[4 marks]

Answer _____

3 (c) Explain why your answers to parts (a) and (b) are estimates.

[1 mark]

4 Darryl wants to buy a camera when he goes on holiday.



If he buys it in Spain it will cost him 140 Euros
If he buys it in England it will cost him £115.

£1 is worth 1.24 Euros.

Is it cheaper for Darryl to buy the camera in Spain or in England?

Tick a box:

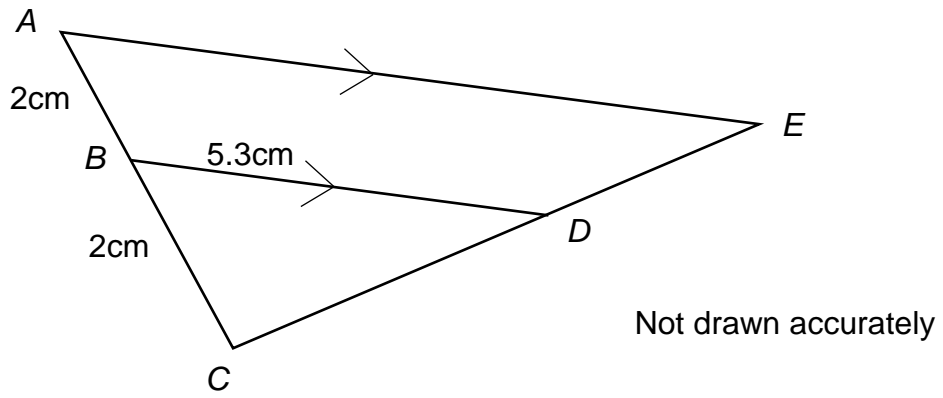
Spain

England

You **must** show your working.

[3 marks]

5



In the diagram, $AB=2\text{cm}$, $BC=2\text{cm}$, $BD=5.3\text{cm}$.
 BD and AE are parallel.

Work out the length of AE .

[2 marks]

Answer _____

6

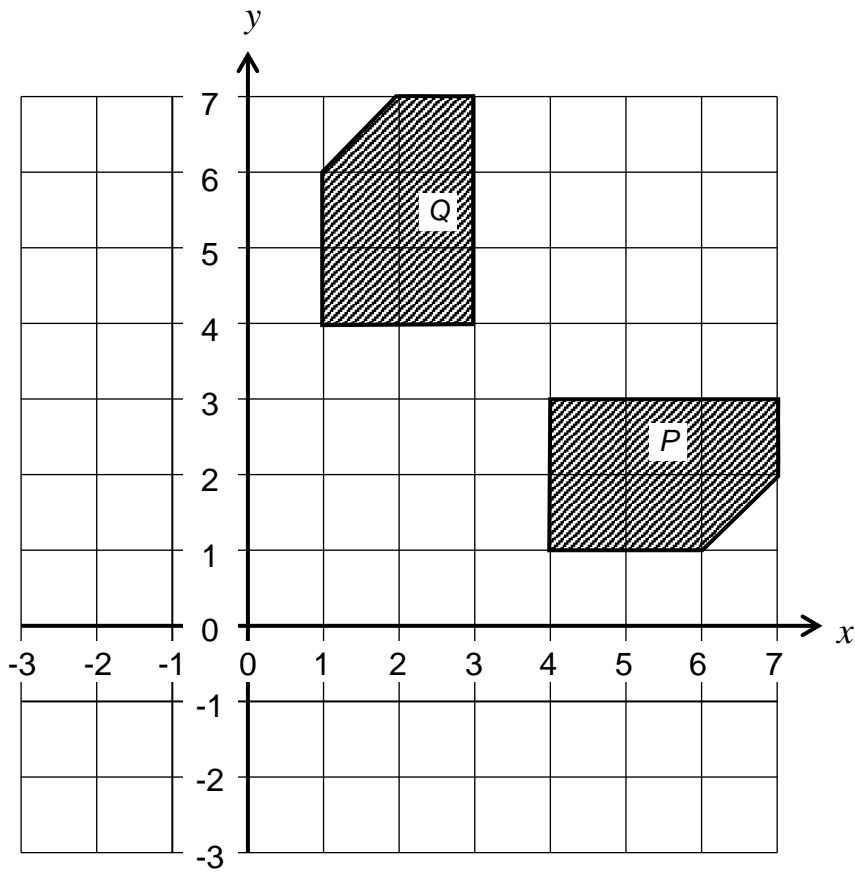
Divide £450 in the ratio 5 : 3 : 2 .

[3 marks]

Answer £ _____ : £ _____ : £ _____

7 Describe **fully** the transformation that moves shape *P* to shape *Q*.

[2 marks]



8 Jack plants a beanstalk.



At the end of one day, the beanstalk is 10cm high.
Each day, it grows 6cm in height.

8 (a) Write down a formula for the height, H , of the beanstalk after n days.

[2 marks]

Answer $H =$ _____

8 (b) What is the height of the beanstalk after twelve days?

[2 marks]

Answer _____ cm

8 (c) After how many complete days does the height of the beanstalk first exceed 2 metres?

[2 marks]

Answer _____ days

9 A straight line passes through the points $(0, 3)$ and $(4, 13)$.

9 (a) Calculate the gradient of the line.

[2 marks]

Answer _____

9 (b) What is the equation of the line?

[2 marks]

Answer _____

9 (c) The point $(50, 130)$ is not on the line.

Is it above or below the line?

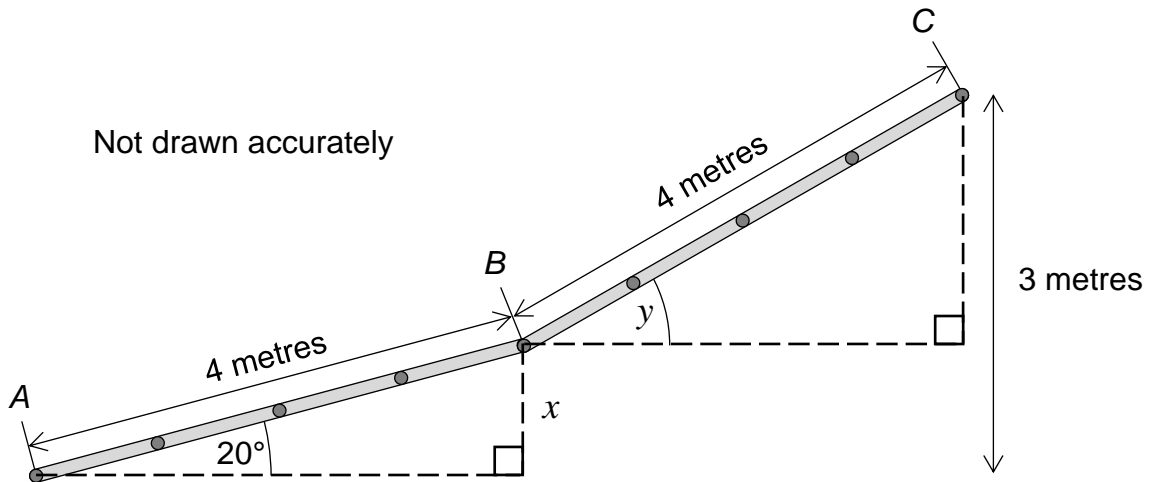
Tick a box:

above the line below the line

You **must** show your working.

[2 marks]

- 10** Two conveyer belts, AB and BC , each of which is a straight line of length 4 metres, are used to move parcels up from one room to another.



- 10 (a)** The first conveyer belt, AB , is inclined at 20° to the horizontal.

Find the height, x , through which a parcel is raised as it moves from A to B .

[3 marks]

Answer _____ metres

- 10 (b)** The difference in height between the two rooms is 3 metres.

Find the angle, y , between the second conveyer belt, BC , and the horizontal.

[2 marks]

Answer _____ $^\circ$

11 Solve the simultaneous equations

$$5x + 4y = 4,$$

$$3x - 2y = 9.$$

Show all your working out.

You must **not** use a trial and improvement method.

[4 marks]

Answer $x =$ _____ $y =$ _____

12 M and N are inversely proportional.
When M is 40, N is 210.

What is the value of M when N is 450?

[4 marks]

Answer _____

13 A cricket ball is suitable for use in a test match if it fits through a circular hoop of circumference 23cm.

The circumference of the hoop is measured to the nearest centimetre.

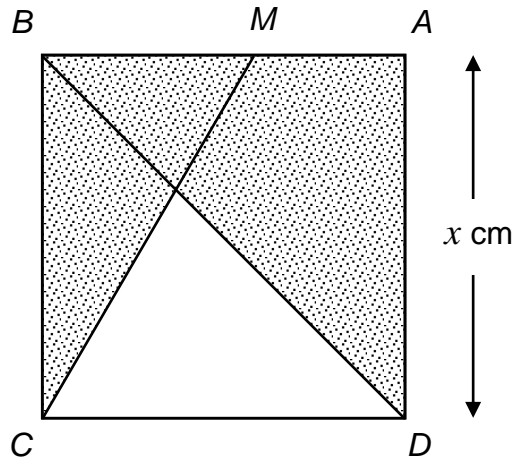
What is the surface area of the biggest cricket ball that is certain to pass through the hoop?

[4 marks]

Answer _____ cm^2

14 $ABCD$ is a square with side length x cm.

M is the midpoint of AB .



Not drawn accurately

Find, in terms of x , the area of the square that is shaded.

Show all your working out, which may be on the diagram.

[5 marks]

Answer _____ cm^2

15 Rearrange this formula to make a the subject:

$$m = \frac{2a + 1}{a - 3}$$

[4 marks]

Answer _____

16 The table shows the number of students in each year group at Jen's school

Year 7	Year 8	Year 9	Year 10	Year 11
265	257	248	217	199

Jen is going to take a sample of 100 students, stratified by year group.

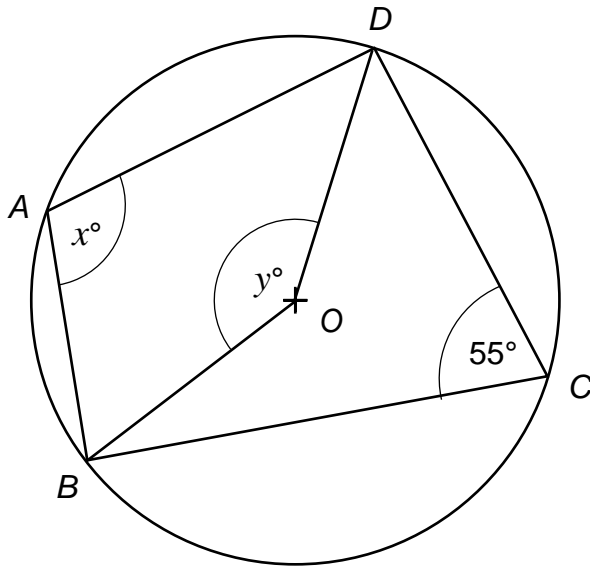
How many members of Year 10 should she include in her sample?

[2 marks]

Answer _____

17 A, B, C and D are all points on a circle with centre O.

ABCD is a quadrilateral.



Not drawn accurately

17 (a) Find the size of angle x
Give a reason for your answer.

[2 marks]

Answer _____ °

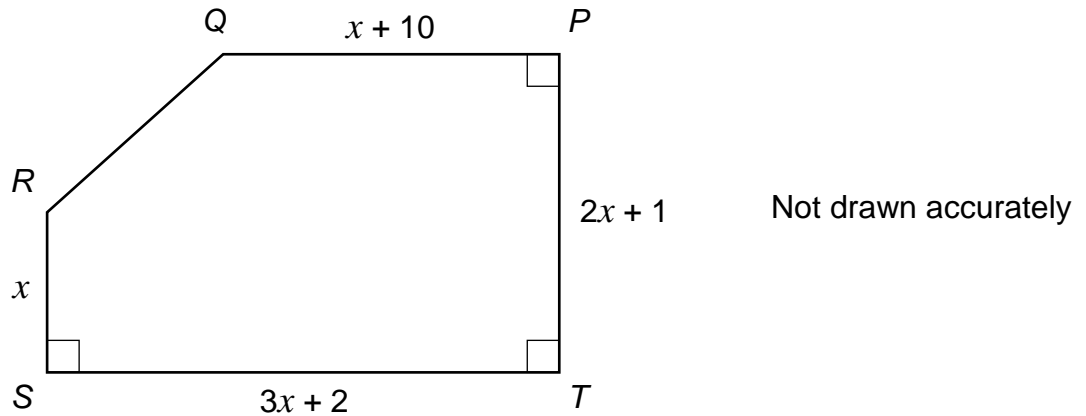
17 (b) Find the size of angle y
Give a reason for your answer.

[2 marks]

Answer _____ °

18 $PQRST$ is a pentagon.

The lengths of four of its sides are given in terms of x .



18 (a) From the information on the diagram, write down an inequality for x and use it to show that x must be bigger than 4.

[2 marks]

18 (b) The area of the pentagon is 156.

Show that

$$x^2 + 2x - 30 = 0.$$

[4 marks]

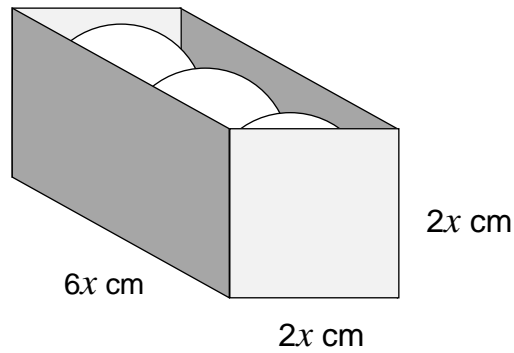
18 (c) Find the length of PQ .

Give your answer to three significant figures.

[3 marks]

Answer _____ cm

- 19 Three spherical balls, each with a radius of x cm are packed into a box. The box is a cuboid, with dimensions $2x$ cm, $2x$ cm and $6x$ cm.



Show that the ratio of the volume of the balls to the amount of empty space inside the box can be written in the form

$$1 : \left(\frac{6}{\pi} - 1 \right).$$

[5 marks]

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