the PiXL club
partners in excellence

Pre Public Examination

GCSE Mathematics (Edexcel style)
March 2017
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		3
2		4
3		2
4		4
5		2
6		3
7		3
8		4
9		6
10		2
11		2
12		2
13		6
14		4
15		3
16		2
17		5
18		3
19		4
20		5
21		7
22		4
Total		80

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

Question 1.

Trains to Slough leave Reading Station every 26 minutes.
Trains to Southall leave the same train station every 10 minutes.

A train to Slough and a train to Southall both leave the train station at 9:30 a.m.

When will a train to Slough and a train to Southall next leave the train station at the same time?

.....

(Total 3 marks)

Question 2.

Timothy, Jane and Sarah share £275.

The ratio of the amount of money Timothy gets to the amount of money Sarah gets is 1 : 5
Timothy gets £96 less than Sarah gets.

What percentage of the £275 does Jane get?
Give your answer to 3sf.

..... %

(Total 4 marks)

Question 3.

Gurdeep thinks that $(y + 7)^2 = y^2 + 49$ for all values of y.

Is Gurdeep right?
You must show how you get your answer.

(Total 2 marks)

Question 4.

The table gives information about the speeds of 85 motorbikes on a road.

Speed (s km/h)	Frequency		
$30 \leq s < 40$	9		
$40 \leq s < 50$	25		
$50 \leq s < 60$	34		
$60 \leq s < 70$	17		

Work out an estimate for the mean speed.

..... km/hr

(Total 4 marks)

Question 5.

The Rail Company increased all prices of train tickets by 2 %.
The cost of a return ticket from Birmingham to Banbury increased by £1.20.

Work out the price of the ticket before the increase.

£ .....

(Total 2 marks)

Question 6.

(*a*) Write 476 00000 in standard form.

.....

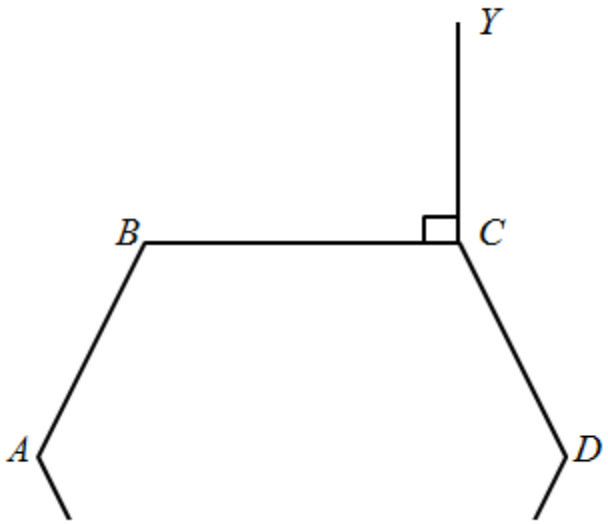
(1)

(*b*) Work out $(2.6 \times 10^{-5}) \times (3.71 \times 10^{-2})$
Give your answer as an ordinary number correct to 3 significant figures.

.....

(2)
(Total 3 marks)

Question 7.



A, *B*, *C* and *D* are four vertices of a regular hexagon.
Angle *BCY* = 90°.

Work out the size of angle *DCY*.
You must show how you get your answer.

.....°

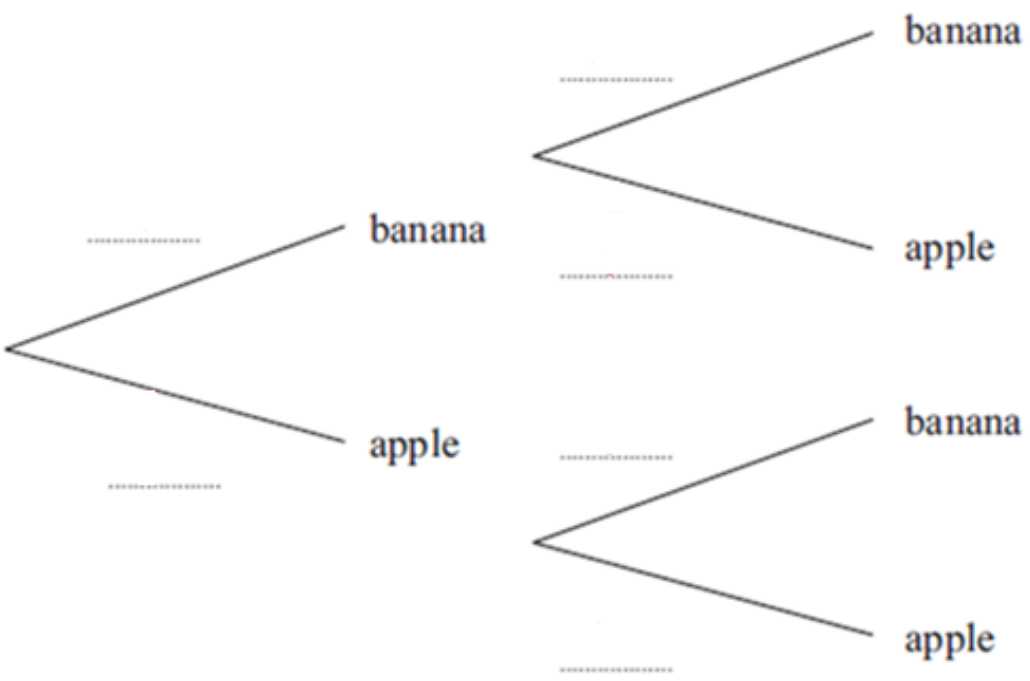
(Total 3 marks)

Question 8.

There are 5 banana smoothies and 4 apple smoothies in a box.

Mostafa takes 'at random' one smoothie from the box.
He writes down its flavour, and puts it back in the box.
Mostafa then takes 'at random' a second smoothie from the box.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that both smoothies are apple flavour.

.....

(2)
(Total 4 marks)

Question 9.

The diagram shows the floor plan of Olivia's dining room.

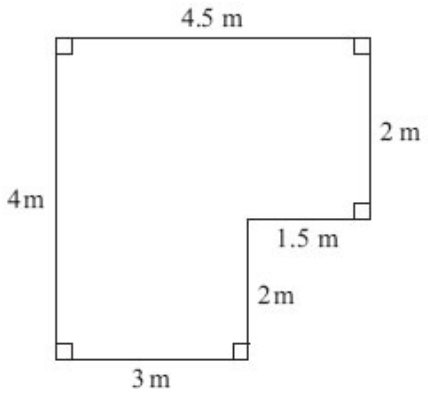


Diagram **NOT** accurately drawn

Olivia is going to cover the floor with wooden floorboards.

The floorboards are sold in packs.
A pack of floorboards costs £14.60 and will cover 2.25 m^2 of floor.

(*a*) Work out the cost of buying enough floorboards to cover the dining room.

£ .....

(5)

Olivia finds out that a pack of floorboards will cover more than 2.25m^2 of floor.

(b) Explain how this might affect the number of packs she needs to buy.

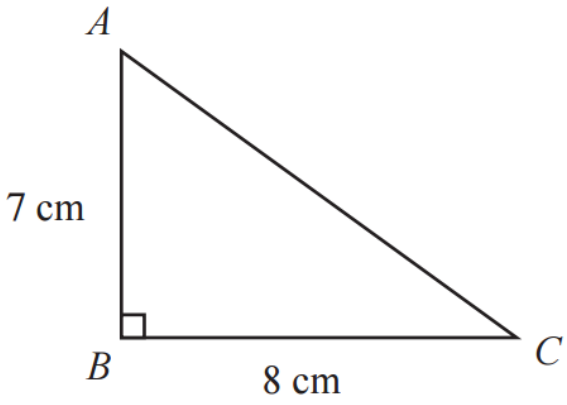
.....

.....

(1)
(Total 6 marks)

Question 10.

ABC is a right-angled triangle.



Work out the size of angle *BAC*.
Give your answer correct to 3 significant figures.

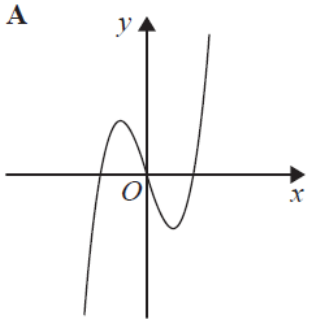
..... °

(Total 2 marks)

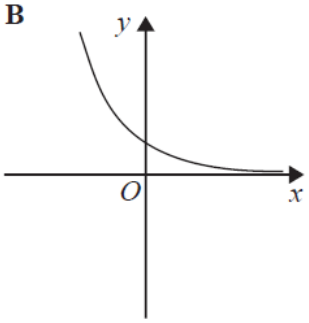
Question 11.

Here are six graphs.

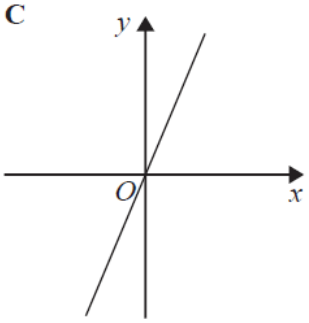
A



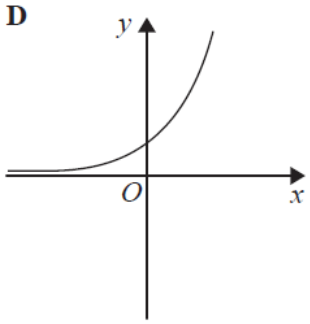
B



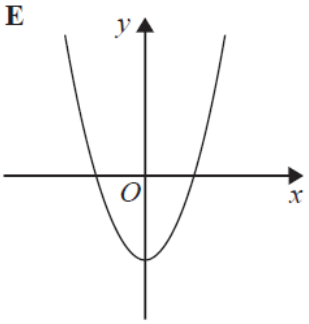
C



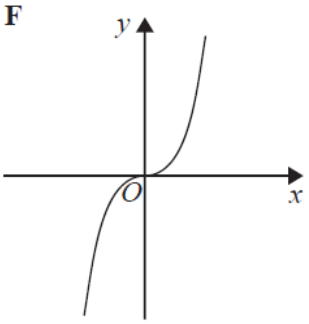
D



E



F



Write down the letter of the graph that could have the equation

(i) $y = x^2 - 4$

.....

(ii) $y = 3x$

.....

(Total 2 marks)

Question 12.

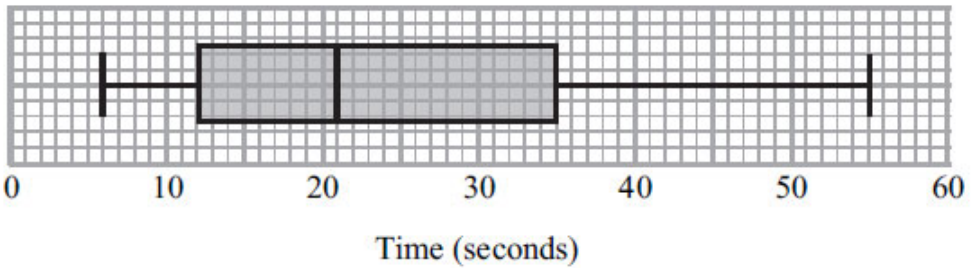
Simplify $7y^4w \times 2y^5w^7$

.....

(Total 2 marks)

Question 13.

Martha recorded the times in seconds, some girls and boys took to find a word in the dictionary.
The box plot below shows the distribution of the times it took the **girls** to find the word in the dictionary.



(*a*) Work out the interquartile range.

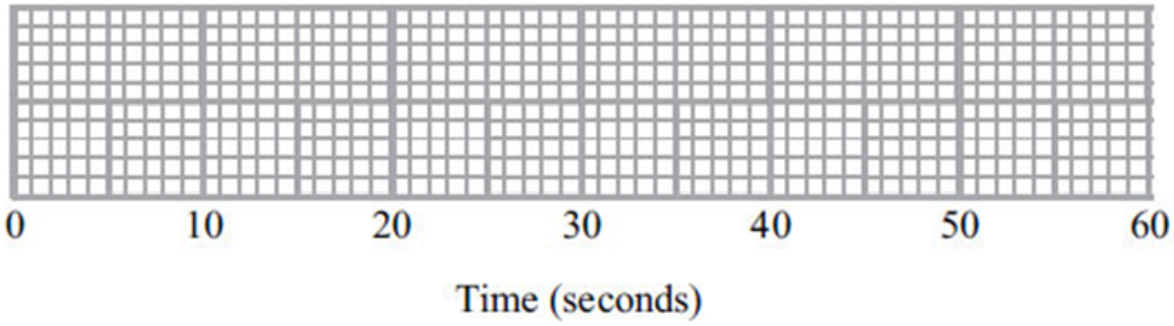
.....

(1)

Here are the times, in seconds, that 15 **boys** took to find the same word in the dictionary.

5 9 11 14 15 20 22 25 27 27 28 30 32 35 44

(b) On the grid below, draw a box plot for this information.



(3)

(*c*) Compare the distributions of the girls' times and the boys' times.

.....

.....

.....

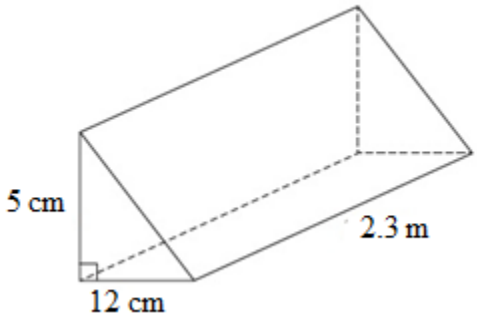
.....

(2)

(Total 6 marks)

Question 14.

The diagram shows a piece of wood cut in the shape of a triangular prism.



The piece of wood is 5 cm by 12 cm by 2.3 m.
The mass of the piece of wood is 6.5 kg.

The piece of wood will float in sea water if the density of the wood is less than the density of the sea water.

In a large pool, 1 litre of sea water has a mass of 980 g.

Will the piece of wood float in this pool?
You must show how you get your answer.

(Total 4 marks)

Question 15.

David invested £2800 in a savings account.
He was paid x % per annum compound interest.
The interest is paid into the account at the end of each year.

At the end of 3 years, the amount of money in the savings account is £3241.35.

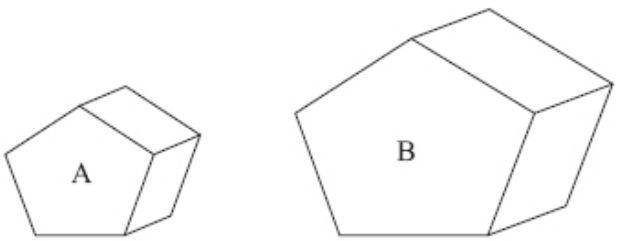
Work out the value of x.

..... %

(Total 3 marks)

Question 16.

The diagram shows two similar solids, **A** and **B**.



The total surface area of the solid **B** is 240 cm^2.

Work out the total surface area of solid **A**.

.....cm^2

(Total 2 marks)

Question 17.

$$n = \frac{\sqrt{r}}{s}$$

$r = 3.74$ correct to 2 decimal places.
$s = 8.123$ correct to 3 decimal places.

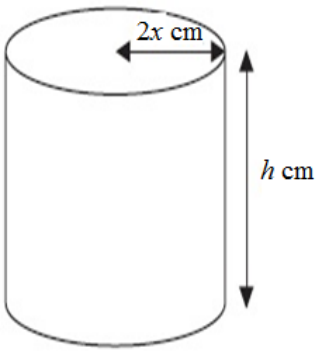
By considering bounds, work out the value of n to a suitable degree of accuracy.
Give a reason for your answer.

.....

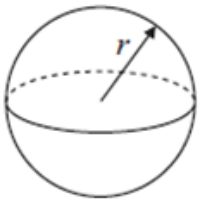
(Total 5 marks)

Question 18.

The diagram shows a solid metal cylinder.



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



The cylinder has base radius $2x$ cm and height h cm.

The metal cylinder is melted.
All the metal is then used to make 162 spheres.

Each sphere has a radius of $\frac{1}{3}x$ cm.

Find an expression, in its simplest form, for h in terms of x.

.....

(Total 3 marks)

Question 19.

Make *n* the subject of

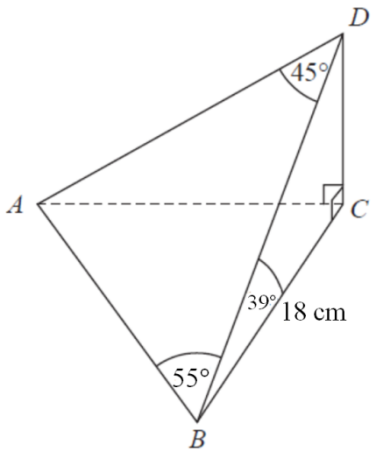
$$g = \frac{6 - 7n}{3 + n}$$

.....

(Total 4 marks)

Question 20.

The diagram shows a pyramid with base *ABC*.



CD is perpendicular to both *CA* and *CB*.

Angle *CBD* = 39° Angle *ADB* = 45° Angle *DBA* = 55°
BC = 18 cm.

Calculate the size of the angle between the line *AD* and the plane *ABC*.
Give your answer correct to 1 decimal place.

.....

(Total 5 marks)

Question 21.

For all values of x

$$f(x) = 2x + 5 \quad \text{and} \quad g(x) = x^2 - 25$$

(a) Find $g(-6)$

.....

(1)

(b) Show that $gf(x) = 4x^2 + 20x$

(2)

(c) Solve $gf(x) = g(7)$

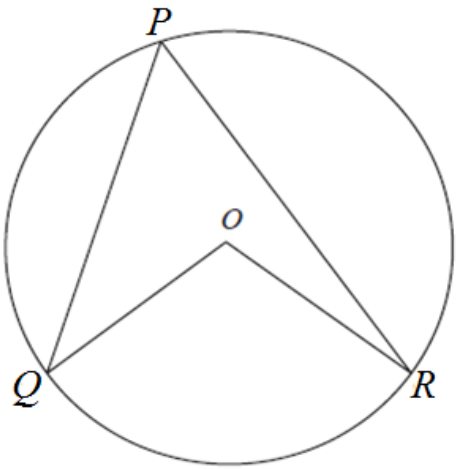
.....

(4)

(Total 7 marks)

Question 22.

P, *Q* and *R* are points on the circumference of a circle centre *O*.
Prove that angle *QOR* is twice the size of angle *QPR* stating your reasons.



(Total 4 marks)

TOTAL FOR PAPER: 80 MARKS