

Write your name here

Surname

Other names

Pearson Edexcel

Level 1/Level 2 GCSE (9 - 1)

Centre Number

Candidate Number

Mathematics

Paper 3 (Calculator)

Specimen Papers Set 2

Time: 1 hour 30 minutes

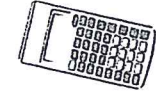
Foundation Tier

Paper Reference

1MA1/3F

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator.

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.
- Answer the questions in the spaces provided – there may be more space than you need.
- Calculators may be used.
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must show all your working out.

Information

- The total mark for this paper is 80.
- 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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- Change 4500 g to kg.
 $4500 \div 1000$
 4.5 kg
 (Total for Question 1 is 1 mark)
- Write 0.19 as a fraction.
 $19/100$
 (Total for Question 2 is 1 mark)
- Write down an even number that is a multiple of 7.
 14
 (Total for Question 3 is 1 mark)
- On the grid, draw a parallelogram.

 (Total for Question 4 is 1 mark)
- Write $\frac{3}{5}$ as a percentage
 60 %
 (Total for Question 5 is 1 mark)

CALCULATOR

6 Coffee is sold in jars.

There are 200 g of coffee in each jar.

Ben makes 8 cups of coffee each day.

He thinks he uses 2 g of coffee to make each cup of coffee.

Ben wants to buy enough coffee for 28 days.

(a) How many jars of coffee does Ben need to buy?

$$2 \times 8 = 16 \text{ g a day}$$

$$16 \times 28 = 448 \text{ g}$$

$$448 \div 200 = 2.24$$

3 jars (3)

Ben finds that he uses 2.5 g of coffee to make each cup of coffee.

(b) How does this affect the number of jars of coffee he needs to buy?
You must give a reason for your answer.

$$2.5 \times 8 = 20$$

$$20 \times 28 = 560 \text{ g}$$

There will be no change in the quantity bought. He will still have enough coffee. (2)
 $200 \times 3 = 600 \text{ g}$ (Total for Question 6 is 5 marks)

7 Write down three different factors of 18 that add together to give a prime number.

Factors of 18 = 1, 2, 3, 6, 9 & 18

2 3 6

(Total for Question 7 is 2 marks)

CALCULATOR

8 A model plane has a length of 17 cm.

The scale of the model is 1 : 200

Work out the length of the real plane.
Give your answer in metres.

$$200 \times 17 = 3400 \text{ cm}$$

$$3400 \div 100 =$$

34

metres

(Total for Question 8 is 2 marks)

9 (a) Find the value of $\sqrt[3]{97.336}$

4.6

(1)

(b) Find the value of $\sqrt{7.29} + (2.3 - 0.85)^2$

3.064718584

(2)

(Total for Question 9 is 3 marks)

CALCULATOR

- 10 The stem and leaf diagram gives information about the speeds of 27 cars.

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

Key:

3 | 8 means 38 miles per hour

- (a) Find the median speed.

56 miles per hour (1)

- (b) Work out the range.

32 miles per hour (1)

One of the cars is chosen at random.

Jack says,

"The probability that the speed of this car is more than 60 miles per hour is $\frac{1}{3}$ "

- (c) Jack is wrong.
Explain why.

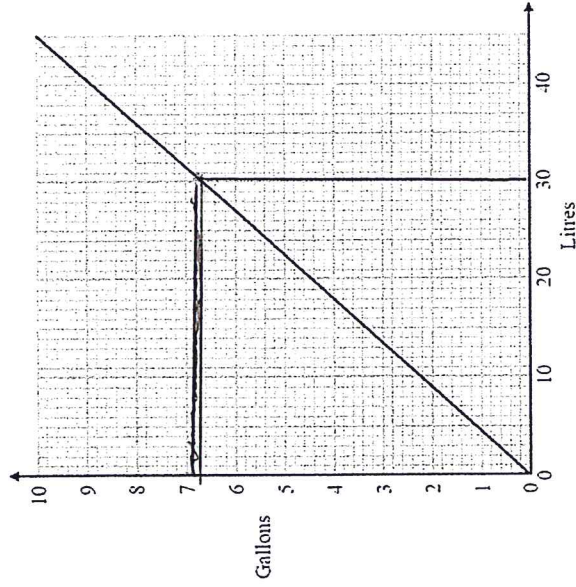
Jack is wrong. $\frac{1}{3}$ of 27 = 9
but cars that sped more
than 60mph is 8. (2)

(Total for Question 10 is 4 marks)

CALCULATOR

-59-

- 11 You can use this graph to change between litres and gallons.



Which is the greater, 60 litres or 12 gallons?
You must show how you get your answer.

30 litres = 6.5 gallons
60 " = 13 "

60 litres

(Total for Question 11 is 2 marks)

CALCULATOR

13

- 12 Ibrar buys 3 kg of apples.
He also buys 0.4 kg of mushrooms.
The total cost is £6.93.

1 kg of apples cost £1.95.

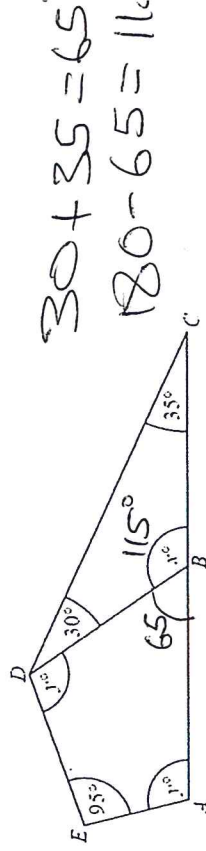
Work out the cost of 1 kg of mushrooms.

$$\begin{aligned} £1.95 \times 3 &= £5.85 \\ £6.93 - £5.85 &= £1.08 \\ £1.08 &\Rightarrow 0.4 \text{ kg} \\ £1.08 + £1.08 + 0.54 &= £2.70 \\ 0.4 + 0.4 + 0.2 &= 1 \text{ kg} \end{aligned}$$

(Total for Question 12 is 3 marks)

CALCULATOR

-60-



ABC is a straight line.
BCD is a triangle.
ABDE is a quadrilateral.

- (a) (i) Work out the value of x .

115°

- (ii) Give a reason for your answer.

Angles in a triangle add up to 180°

- (b) Work out the value of y .

$$\begin{aligned} 360 - 95^\circ - 65^\circ &= 200 \\ 200^\circ \div 2 &= 100 \end{aligned}$$

100

(2)

(Total for Question 13 is 4 marks)

CALCULATOR

14 You can use this rule to work out the total cost, in pounds, of hiring a carpet cleaner.

Multiply the number of days by 7.8 and then add 12

Andy hires a carpet cleaner.
The total cost is £82.20.

(a) Work out the number of days Andy hires the carpet cleaner for.

$$\begin{aligned}
 \square \times 7.8 + 12 &= 82.20 \\
 \square \times 7.8 &= 82.20 - 12 = 70.2 \\
 \square &= \frac{70.2}{7.8} = 9
 \end{aligned}$$

..... 9 days (2)

Chloe hires a carpet cleaner for y days.
The total cost is £ T .

(b) Write down a formula for T in terms of y .

$$\begin{aligned}
 T &= y \times 7.8 + 12 \\
 T &= 7.8y + 12
 \end{aligned}$$

..... 7.8y + 12 (2)

(Total for Question 14 is 4 marks)

CALCULATOR

15 There are 35 pens in a box.
15 of the pens are green.
The rest of the pens are red.

Green 15 Red 20

(a) What fraction of the pens in the box are red?

$$\text{Red pens} = \frac{20}{35} = \frac{4}{7}$$

..... $\frac{4}{7}$ (1)

(b) Write down the ratio of the number of green pens to the number of red pens.
Give your ratio in its simplest form.

$$\begin{aligned}
 G : R & \\
 15 : 20 & \\
 \div 5 & \\
 3 : 4 &
 \end{aligned}$$

..... 3:4 (2)

(Total for Question 15 is 3 marks)

CALCULATOR

16 Ross rolled an ordinary dice 30 times.

The frequency table gives information about his results.

Score	Frequency
1	7
2	5
3	4
4	4
5	6
6	4

Ross worked out the mean score as 8.

(a) Explain why it is impossible for the mean score to be 8.

It is impossible because if Mean is 8, then the total number of rolls should be $6 \times 8 = 48$. When we know that Ross rolled the dice only 30 times. (1)

Graham also worked out the mean score.

Here is his working.

$$1 \times 7 + 2 \times 5 + 3 \times 4 + 4 \times 4 + 5 \times 6 + 6 \times 4 = 99$$

$$99 \div 6 = 16.5$$

The mean score is 16.5

(b) Describe the mistake Graham made in his method to work out the mean score.

Graham should've divided the total by the total of frequencies i.e. 30. Amount of 99 (1)

(Total for Question 16 is 2 marks)

17

Amelia, Hayden and Sophie did a test. The total for the test was 75 marks.

Amelia got 56% of the 75 marks.

Hayden got $\frac{8}{15}$ of the 75 marks.

Sophie got 43 out of 75.

Who got the highest mark? You must show all your working.

$$\text{Amelia} = 0.56 \times 75 = 42 \text{ Marks}$$

$$\text{Hayden} = \frac{8}{15} \times 75 = 40 \text{ Marks}$$

Sophie got 43 Marks

Conclusion:

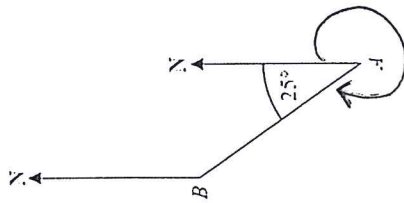
Sophie has got the highest marks.

(Total for Question 17 is 3 marks)

CALCULATOR

CALCULATOR

- 18 The diagram shows the positions of two churches, A and B.



Amber says,

"The bearing of church B from church A is 025° "

Amber is wrong.
Explain why.

Amber measured angle anti-clockwise from the north at A. She should have measured it clockwise $360 - 25 = 335^{\circ}$

(Total for Question 18 is 1 mark)

- 19 There are only blue counters, green counters, red counters and yellow counters in a bag. George is going to take at random a counter from the bag.

The table shows each of the probabilities that George will take a blue counter or a green counter or a yellow counter.

Colour	blue	green	red	yellow
Probability	0.5	0.2		0.25

- (a) Work out the probability that George will take a red counter.

$$0.5 + 0.2 + 0.25 = 0.95$$

$$1 - 0.95 = 0.05$$

(1) 0.05

There are 120 counters in the bag.

- (b) Work out the number of green counters in the bag.

$$\text{Number of green counters} = 0.20 \times 120 = 24$$

24 counters (2)

(Total for Question 19 is 3 marks)

- 20 (a) Show the inequality $-2 \leq x < 3$ on the number line below.



- (b) Solve the inequality $4y + 7 < 16$

$$4y < 16 - 7$$

$$4y < 9$$

$$y < 9/4$$

(Total for Question 20 is 4 marks)

CALCULATOR

CALCULATOR

- 21 Here are the first five terms of an arithmetic sequence. 4

$$\boxed{-7} \quad -3 \quad 1 \quad 5 \quad 9 \quad 13$$

Find an expression, in terms of n , for the n th term of this sequence.

$$4n - 7$$

..... $4n - 7$
(Total for Question 21 is 2 marks)

- 22 The ratio of the number of boys to the number of girls in a school is 4 : 5
There are 95 girls in the school.

Work out the total number of students in the school.

Boys : Girls

$$4 : 5$$

$$5 \text{ represents } - 95 \text{ girls.}$$

$$1 \text{ represent } - \frac{95}{5} = 19 \text{ girls.}$$

$$\text{Boys} = 4 \times 19 = 76$$

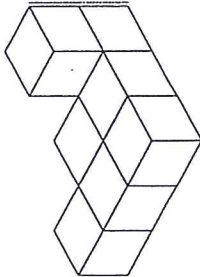
$$76 + 95 = 171 \text{ students.}$$

(Total for Question 22 is 3 marks)

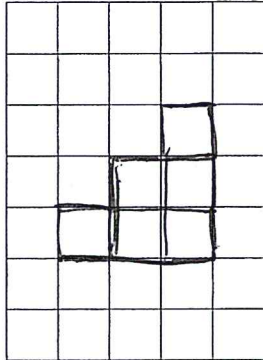
CALCULATOR

CALCULATOR

- 23 The diagram represents a solid made from seven centimetre cubes.



On the centimetre grid below, draw a plan of the solid.



(Total for Question 23 is 2 marks)

- 24 Make t the subject of the formula $y = \frac{t}{3} - 2a$

$$3y = t - 6a$$

$$3y + 6a = t$$

$$t = 3y + 6a$$

$$t = 3y + 6a$$

(Total for Question 24 is 2 marks)

- 25 Jim rounds a number, x , to one decimal place. The result is 7.2.

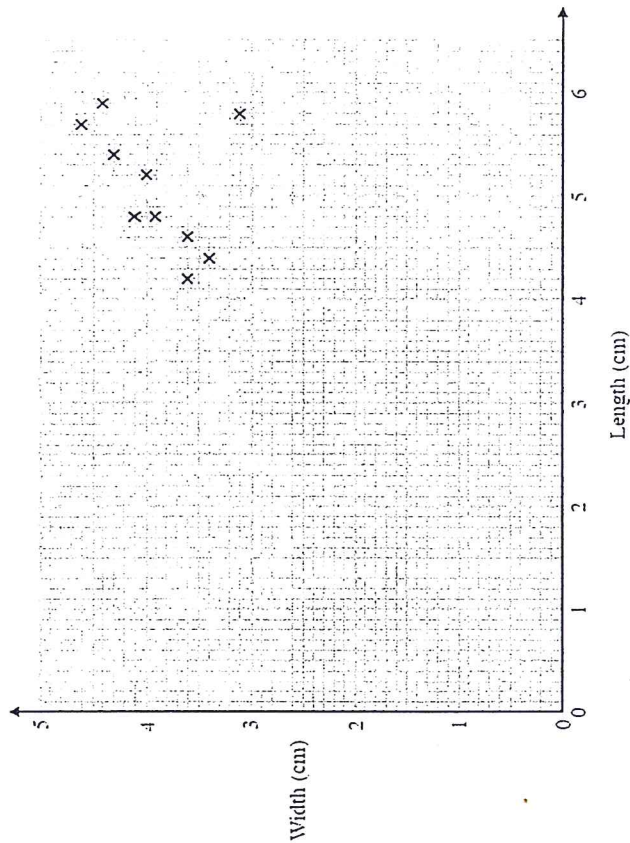
Write down the error interval for x .

$$7.2 - 0.05 \leq x < 7.2 + 0.05$$

$$7.15 \leq x < 7.25$$

(Total for Question 25 is 2 marks)

- 26 Katie measured the length and the width of each of 10 pine cones from the same tree. She used her results to draw this scatter graph.



- (a) Describe one improvement Katie can make to her scatter graph.

She can start the horizontal scale from 3 or 4 (1)

The point representing the results for one of the pine cones is an outlier.

- (b) Explain how the results for this pine cone differ from the results for the other pine cones.

The widths of most of the pine cones is between 3 and 5. The width of the pine cone that is an outlier is 3 (1)

(Total for Question 26 is 2 marks)

CALCULATOR

CALCULATOR

27

At a depth of x metres, the temperature of the water in an ocean is $T^{\circ}\text{C}$.
At depths below 900 metres, T is inversely proportional to x .

T is given by

$$T = \frac{4500}{x}$$

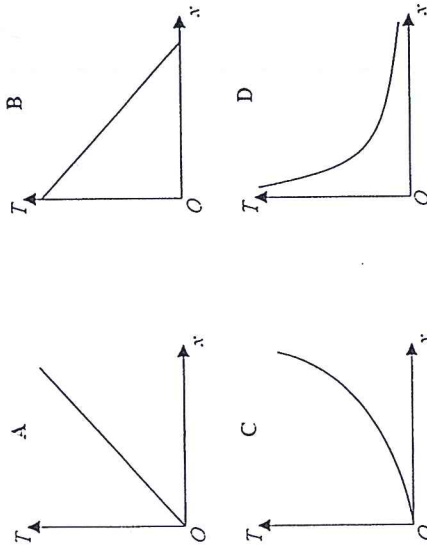
(a) Work out the difference in the temperature of the water at a depth of 1200 metres and the temperature of the water at a depth of 2500 metres.

At the depth 1200 m At the depth 2500 m

$$T = \frac{4500}{1200} = 3.75 \qquad T = \frac{4500}{2500} = 1.8$$

Difference ~~between~~ $3.75 - 1.80 = 1.95^{\circ}\text{C}$ (3)

Here are four graphs.



One of the graphs could show that T is inversely proportional to x .

(b) Write down the letter of this graph.

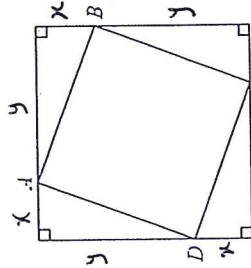
D (1)

(Total for Question 27 is 4 marks)

28 Here is a right-angled triangle.



Four of these triangles are joined to enclose the square ABCD as shown below.



Show that the area of the square ABCD is $x^2 + y^2$

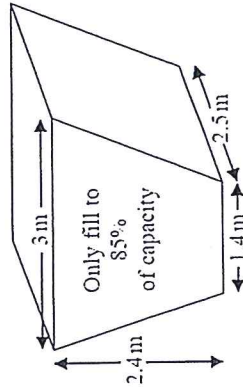
DC = hypotenous = $\sqrt{x^2 + y^2}$ (using Pythagoras theorem)
 that means all sides are equals to $\sqrt{x^2 + y^2}$

$$\begin{aligned} \text{area of Square} &= (\text{length})^2 \\ &= \left(\sqrt{x^2 + y^2}\right)^2 \\ &= x^2 + y^2 \text{ as required.} \end{aligned}$$

(Total for Question 28 is 3 marks)

CALCULATOR

29 The diagram shows an oil tank in the shape of a prism. The cross section of the prism is a trapezium.



The tank is empty.

Oil flows into the tank.
 After one minute there are 300 litres of oil in the tank.

Assume that oil continues to flow into the tank at this rate.

(a) Work out how many more minutes it takes for the tank to be 85% full of oil.
 ($1 \text{ m}^3 = 1000 \text{ litres}$)

$$\begin{aligned} \text{Volume of tank} &= \text{Area of cross-section} \times \text{length} \\ &= \frac{(1.4 + 3) \times 2.4}{2} \times 2.5 = 13.2 \text{ m}^3 \end{aligned}$$

$$1000 \text{ m}^3 = 1000 \text{ litres}$$

$$13.2 \text{ m}^3 = 13.2 \times 1000 = 13200 \text{ litres}$$

$$85\% \text{ of tank} = 0.85 \times 13200 = 11220 \text{ litres}$$

$$\text{Total time to fill } 85\% \text{ of tank} = 11220 \div 300 = 37.4 \text{ minutes}$$

$$\text{because in one minute it has already filled } 300 \text{ litres}$$

$$\text{so the remaining time} = 37.4 - 1 = 36.4 \text{ minutes.}$$

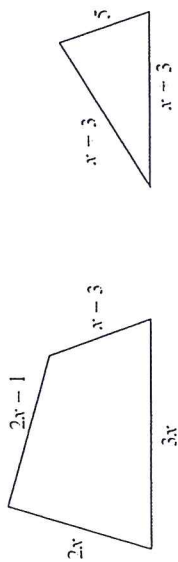
The assumption about the rate of flow of the oil could be wrong.

(b) Explain how this could affect your answer to part (a).

If rate of flow is more then 300 litres per minute then it will take less time to fill the tank. Alternatively it will take more time.

(Total for Question 29 is 6 marks)

CALCULATOR



In the diagram all measurements are in centimetres.

The perimeter of the quadrilateral is twice the perimeter of the triangle.

Work out the perimeter of the quadrilateral.

According to the question

$$2x + 2x - 1 + x - 3 + 3x = 2(x - 3 + 5 + x - 3)$$

$$8x - 4 = 2(2x + 2)$$

$$8x - 4 = 4x + 4$$

$$8x - 4x = 10 + 4$$

$$4x = 14$$

$$x = \frac{14}{4} = \frac{7}{2}$$

So each side of quadrilateral is:

$$2x = 2 \times \frac{7}{2} = 7$$

$$3x = 3 \times \frac{7}{2} = 10.5$$

$$x - 3 = \frac{7}{2} - 3 = 0.5$$

$$2x - 1 = 2 \times \frac{7}{2} - 1 = 6$$

$$\text{Perimeter} = 7 + 10.5 + 0.5 + 6 = \underline{\underline{24}} \dots \dots \dots \text{cm}$$

TOTAL FOR PAPER IS 80 MARKS

Write your name here

Surname

Other names

Pearson Edexcel

Level 1 / Level 2

GCSE (9-1)

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Mathematics

Paper 2 (Calculator)

Foundation Tier

Thursday 8 June 2017 – Morning

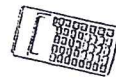
Time: 1 hour 30 minutes

Paper Reference

1MA1/2F

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- Check your answers if you have time at the end.

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- Simplify $5p - 3p + p$ 3p (1)
 - Simplify $m^3 + m^3$ 2m (1)

(c) Simplify $10 + 3c + 5d - 7c + d$

$$10 + 3c - 7c + 5d + d$$

$$10 - 4c + 6d$$

(Total for Question 1 is 4 marks)

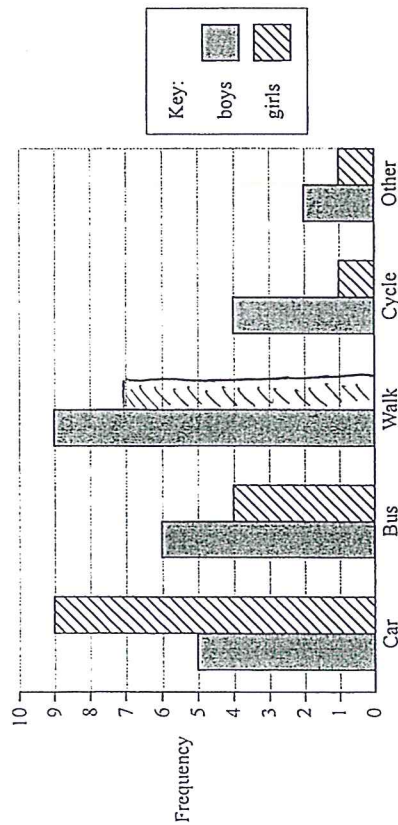
2 Write 56.78 correct to one significant figure.

60

(Total for Question 2 is 1 mark)

CALCULATOR

- 3 A teacher asks the students in Year 6 what type of transport they use to get to school. The dual bar chart shows some of the results.



- (a) What is the most popular type of transport used by the boys?

Walk (1)

7 girls walk to school.

- (b) Show this information on the dual bar chart. (1)

More of the students get to school by car than by bus.

- (c) How many more?

$$\text{Car} = 5 + 9 = 14$$

$$\text{Bus} = 4 + 3 = 7$$

$$14 - 7 = 7$$

7 more (1)

The number of students in Year 5 is the same as the number of students in Year 6.

- (d) What is the total number of students in Years 5 and 6?

$$\begin{aligned} \text{Total Year 6 Students} &= 5 + 9 + 4 + 4 + 9 + 7 + 4 + 1 + 2 + 1 \\ &= 48 \\ \text{Total Year 5 is also } 48 &= 48 + 48 = 96 \\ \text{Total number of years 5 \& 6} &= 96 \end{aligned}$$

(Total for Question 3 is 5 marks)

CALCULATOR

CALCULATOR

- 4 Here are four fractions.

$$\frac{2}{5}, \frac{11}{30}, \frac{1}{2}, \frac{7}{15}$$

Write these fractions in order of size. Start with the smallest fraction.

$$\checkmark \frac{2}{5} = 0.4$$

$$\checkmark \frac{11}{30} = 0.367$$

$$\checkmark \frac{1}{2} = 0.5$$

$$\checkmark \frac{7}{15} = 0.467$$

$$\frac{11}{30}, \frac{2}{5}, \frac{7}{15}, \frac{1}{2}$$

(Total for Question 4 is 2 marks)

5 David sells CDs in a shop.

The tally chart shows information about the number of CDs David sold on Monday, on Tuesday and on Wednesday.

	Tally	Frequency
Monday		12
Tuesday		18
Wednesday		8

(a) Write down one thing that is wrong with the tally chart.

The total number of frequency on Monday should be 13 and not 12. (1)

David drew this pictogram to show the information for Tuesday and Wednesday.

Tuesday	○○○○○
Wednesday	○○○

Key: ○ represents 3 CDs

(b) Write down one thing that is wrong with this pictogram.

Since ○ represents 3 CDs sold, it looks like on Tuesday he sold $5 \times 3 = 15$ CDs when he sold 18 CDs on that day. (1)

(Total for Question 5 is 2 marks)

CALCULATOR

CALCULATOR

6 There are 495 coins in a bottle.

$\frac{1}{3}$ of the coins are £1 coins.

124 of the coins are 50p coins.

The rest of the coins are 20p coins.

Work out the total value of the 495 coins.

$$\begin{aligned} \text{Total Coins} &= 495 \\ \text{£1 Coins} &= \frac{1}{3} \times 495 = 165 \end{aligned}$$

$$50p \text{ Coins} = 124$$

$$\text{Remaining} = 495 - (165 + 124)$$

$$= 495 - 289 = 206$$

$$20p \text{ coins} = 206$$

$$\begin{aligned} \text{Total value} &= 165 \times 1 + 124 \times 0.50 + 206 \times 0.20 \\ &= 165 + 62 + 41.20 \\ &= \text{£}268.20 \end{aligned}$$

$$\text{£}268.20$$

(Total for Question 6 is 4 marks)

7 The probability that a new fridge has a fault is 0.015.

What is the probability that a new fridge does not have a fault?

$$1 - 0.015$$

$$= 0.985$$

$$0.985$$

(Total for Question 7 is 1 mark)

8 Here is a list of numbers.

21 22 23 24 25 26 27 28 29

(a) From the numbers in the list, write down a square number.

$$25$$

(1)

(b) From the numbers in the list, write down a number that is a multiple of both 4 and 6.

$$24$$

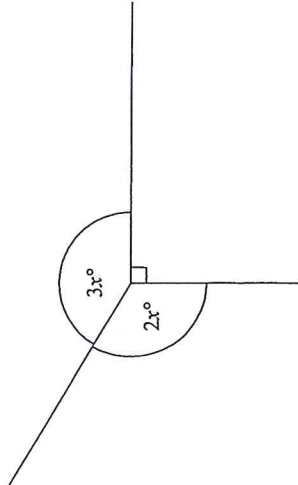
(1)

(c) Write down all the prime numbers in the list.

$$23, 29$$

(1)

(Total for Question 8 is 3 marks)



Find the value of x .

$$3x + 2x + 90 = 360$$

$$5x = 360 - 90 = 270$$

$$x = \frac{270}{5} = 54$$

$$x = 54$$

(Total for Question 9 is 3 marks)

10 Suha is going to buy 150 envelopes.

Here is some information about the cost of envelopes in two shops.

Letters2send	Stationery World
Pack of 25 envelopes for £3.49	Pack of 10 envelopes for £2.10 Buy 2 packs get 1 pack free

Suha wants to buy the envelopes as cheaply as possible.
Which shop should Suha buy the 150 envelopes from?
You must show how you get your answer.

From Letters2send

she needs $\frac{150}{25} = 6$ packs

$$\text{Cost} = 6 \times 3.49$$

$$\boxed{\text{Cost} = £20.94}$$

From Stationery world

£

$$\begin{array}{r} 10 \\ +10 \\ +10 \\ \hline 30 \end{array}$$

$$30 \text{ envelopes} = £2.10 \times 2 = 4.20$$

$$150 \div 30 = 5$$

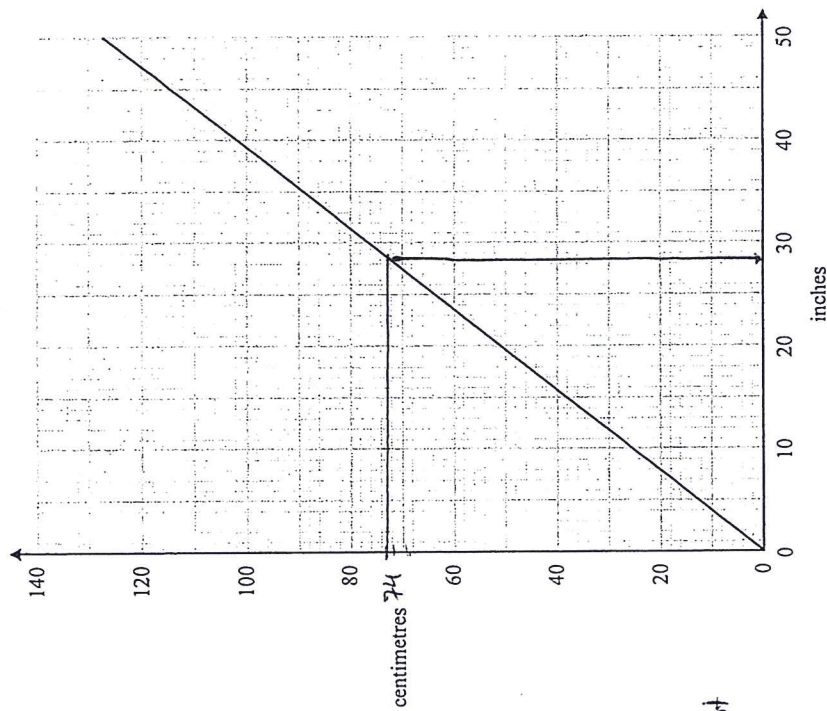
she needs 5
more lots of 30
envelops $5 \times 30 = 150$
if ~~30~~ The total Cost
 $= 5 \times 4.20$

$$\boxed{\text{Cost} = £21}$$

Letters2Send is the cheapest option

(Total for Question 10 is 4 marks)

11 You can use this graph to change between inches and centimetres.



(a) Change 74 cm to inches.

..... 29.6 inches
(1)

Daniel's height is 6 feet 3 inches.
1 foot = 12 inches

(b) What is Daniel's height in centimetres?

$$\begin{aligned} 6 \text{ feet} &= 6 \times 12 = 72 \\ 6 \text{ feet } 3 \text{ inches} &= 75 \text{ inches} \\ 75 \times 2.5 &= 187.5 \text{ cm} \end{aligned}$$

..... 187.5 centimetres
(3)

(Total for Question 11 is 4 marks)

12 Find the value of $\frac{\sqrt{13.4-1.5}}{(6.8+0.06)^2}$

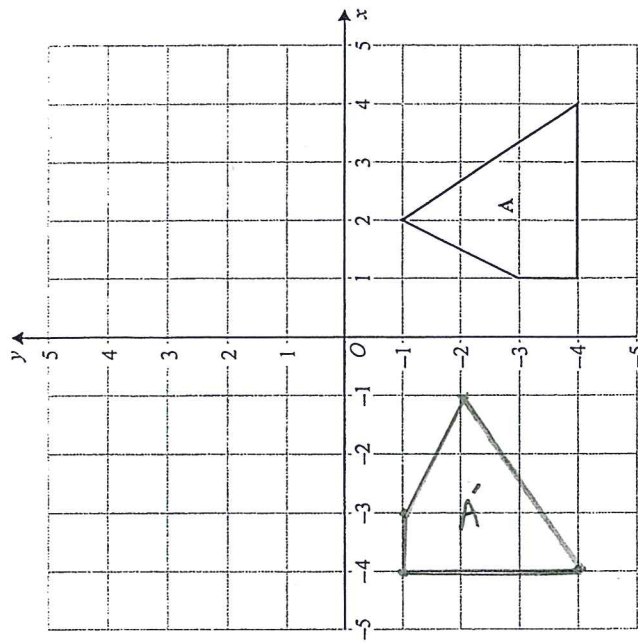
Write down all the figures on your calculator display.

$$= 0.07330359$$

..... 0.07330359
(Total for Question 12 is 2 marks)

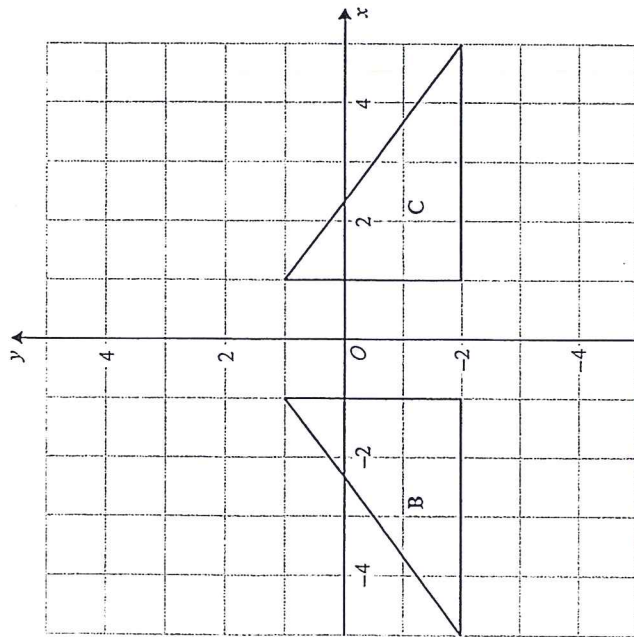
CALCULATOR

CALCULATOR



(a) Rotate shape A 90° clockwise about centre O.

(2)



- (b) Describe fully the single transformation that maps triangle B onto triangle C.
It is reflection about y-axis (or line $x=0$)
- (2)
- (Total for Question 13 is 4 marks)

- 14 (a) Factorise $5 - 10m$

$$5(1-2m)$$

$$5(1-2m) \dots\dots\dots (1)$$

- (b) Factorise fully $2a^2b + 6ab^2$

$$2ab(a+3b)$$

$$2ab(a+3b) \dots\dots\dots (2)$$

(Total for Question 14 is 3 marks)

- 15 (a) Write 4.7×10^{-1} as an ordinary number.

$$0.47 \dots\dots\dots (1)$$

- (b) Work out the value of $(2.4 \times 10^3) \times (9.5 \times 10^5)$
 Give your answer in standard form.

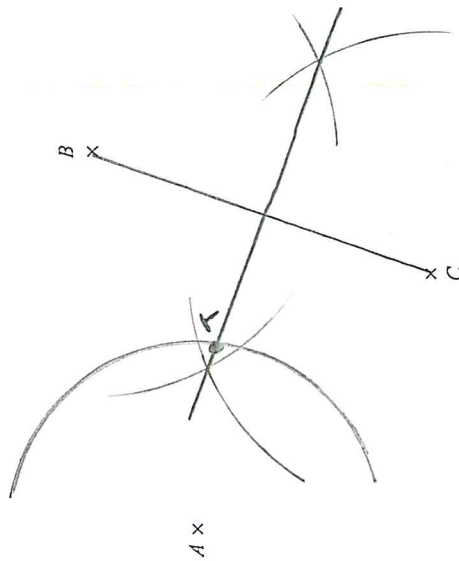
$$2.4 \times 9.5 \times 10^8$$

$$2.28 \times 10^9$$

$$2.28 \times 10^9 \dots\dots\dots (2)$$

(Total for Question 15 is 3 marks)

16 A, B and C are three points on a map.



1 cm represents 100 metres.

Point T is 250 metres from point A.

Point T is equidistant from point B and point C.

On the map, show one of the possible positions for point T.

over.

(Total for Question 16 is 3 marks)

CALCULATOR

-76-

17 The table shows the probabilities that a biased dice will land on 2, on 3, on 4, on 5 and on 6.

Number on dice	1	2	3	4	5	6
Probability	0.31	0.17	0.18	0.09	0.15	0.1

Neymar rolls the biased dice 200 times.

Work out an estimate for the total number of times the dice will land on 1 or on 3.

$$\text{Probability of 1} = 1 - (0.17 + 0.18 + 0.09 + 0.15 + 0.1) = 0.31$$

Prob that total number of times

$$\text{the dice will land on 1 or 3} = (0.31 + 0.18) \times 200$$

$$= 98 \text{ times}$$

98

(Total for Question 17 is 3 marks)

CALCULATOR

- 18 On Saturday, some adults and some children were in a theatre.
The ratio of the number of adults to the number of children was 5 : 2
Each person had a seat in the Circle or had a seat in the Stalls.

$$\frac{3}{4} \text{ of the children had seats in the Stalls.}$$

$$117 \text{ children had seats in the Circle.}$$

$$\text{There are exactly 2600 seats in the theatre.}$$

On this Saturday, were there people on more than 60% of the seats?
You must show how you get your answer.

$$\frac{3}{4} \text{ of children sit in the Stalls}$$

$$\frac{1}{4} \text{ of the children will sit in the circle.}$$

$$\frac{1}{4} \text{ of Total} = 117$$

$$\text{Total Children} = 117 \times 4 = 468 \text{ children in total.}$$

Since Adult : Children is

$$5 : 2$$

$$\text{i.e. } 2.5 : 1$$

$$\text{So total adults} = 2.5 \times 468 = 1170$$

$$\text{Altogether they are } 1170 + 468 = 1638$$

$$60\% \text{ of all seats} = 0.60 \times 2600 = 1560$$

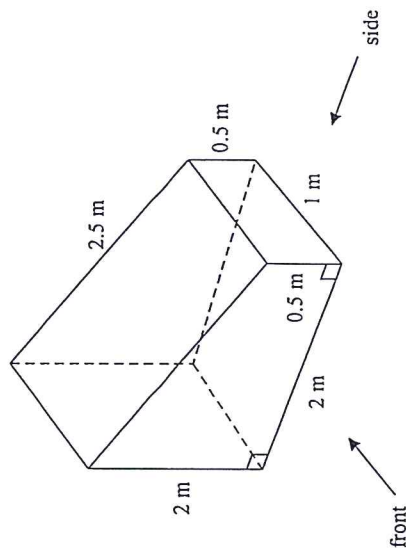
This shows that there were more people than 60% of the seats.

(Total for Question 18 is 5 marks)

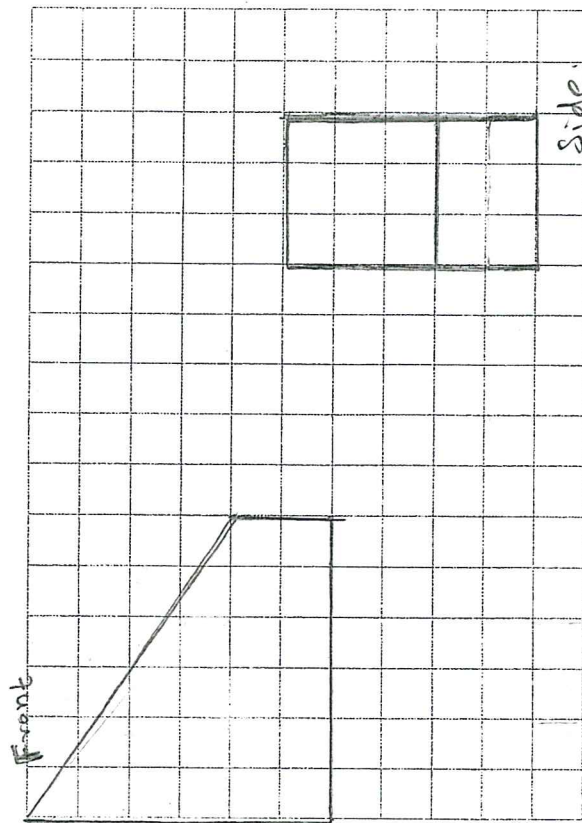
CALCULATOR

-77-

- 19 The diagram shows a prism with a cross section in the shape of a trapezium.



On the centimetre grid below, draw the front elevation and the side elevation of the prism.
Use a scale of 2 cm to 1 m.



(Total for Question 19 is 4 marks)

CALCULATOR

Olly drove 56 km from Liverpool to Manchester.
He then drove 61 km from Manchester to Sheffield.

Olly's average speed from Liverpool to Manchester was 70 km/h.
Olly took 75 minutes to drive from Manchester to Sheffield.

(a) Work out Olly's average speed for his total drive from Liverpool to Sheffield.

$L = \text{Liverpool}$ $M = \text{Manchester}$ $S = \text{Sheffield}$



Total distance from Liverpool to Sheffield = $\boxed{117 \text{ km}}$

$$\text{Time (L to M)} = \frac{D}{S} = \frac{56}{70} = 0.8 \text{ h} = 0.8 \times 60 = 48 \text{ min}$$

$$\text{Time (M to S)} = 75 \text{ min}$$

$$\text{Time (L to S)} = 48 + 75 = 123 \text{ min or } 2.05 \text{ hours}$$

$$\text{Average speed (L to S)} = \frac{117}{2.05} = 57.1 \text{ km/h} \quad (1 \text{ dp})$$

Janie drove from Barnsley to York.

Janie's average speed from Barnsley to Leeds was 80 km/h.

Her average speed from Leeds to York was 60 km/h.

Janie says that the average speed from Barnsley to York can be found by working out the mean of 80 km/h and 60 km/h.

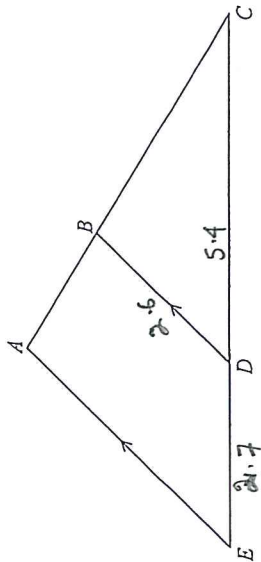
(b) If Janie is correct, what does this tell you about the two parts of Janie's journey?

Janie is wrong because she needs to find the total distance from Barnsley to York & the time between two cities and then find the speed. (1)

(Total for Question 20 is 5 marks)

CALCULATOR

CALCULATOR



ABC and EDC are straight lines.
 EA is parallel to DB .

$EC = 8.1 \text{ cm}$.

$DC = 5.4 \text{ cm}$.

$DB = 2.6 \text{ cm}$.

$$8.1 - 5.4 = 2.7$$

$$\text{Scale factor} = \frac{8.1}{5.4} = 1.5$$

(a) Work out the length of AE .

$$AE = 2.6 \times 1.5 = 3.9$$

$$3.9 \text{ cm} \quad (2)$$

$AC = 6.15 \text{ cm}$.

(b) Work out the length of AB .

$$1.5 \overline{BC} = 6.15$$

$$\overline{BC} = \frac{6.15}{1.5} = 4.1$$

$$\text{So } AB = 6.15 - 4.1 = 2.05$$

$$2.05 \text{ cm} \quad (2)$$

(Total for Question 21 is 4 marks)

- 22 Anil wants to invest £25 000 for 3 years in a bank.

Personal Bank	Secure Bank
Compound Interest	Compound Interest
2% for each year	4.3% for the first year 0.9% for each extra year

Which bank will give Anil the most interest at the end of 3 years?
You must show all your working.

Personal Bank Secure Bank

$$25000 \times (1.02)^3$$

$$= £26530.20$$

for first year

$$25000 \times 0.043 = 26075$$

For the next two years

$$26075 \times (1.009)^2 = £26546.5$$

Anil must choose Secure Bank

(Total for Question 22 is 3 marks)

- 23 A number, n , is rounded to 2 decimal places.
The result is 4.76.

Using inequalities, write down the error interval for n .

4.755 4.765 Error interval $n \leq 4.765$

4.76

(Total for Question 23 is 2 marks)

CALCULATOR

CALCULATOR

- 24 Solve $x^2 + 5x - 24 = 0$

$$\boxed{8} \times \boxed{3} = -24$$

$$\begin{array}{r} \boxed{8} \\ + \boxed{-3} \\ \hline 5 \end{array}$$

$$(x+8)(x-3) = 0$$

Either $x+8=0$
 $x=-8$

or $x-3=0$
 $x=3$

$$x = -8, 3$$

(Total for Question 24 is 3 marks)

- 25 Here are the first six terms of an arithmetic sequence.

$\boxed{-2}$ $\overbrace{3 \quad 8 \quad 13}^3$ 18 23 28

- (a) Find an expression, in terms of n , for the n th term of this sequence.

$$5n - 2$$

$$\dots\dots\dots 5n - 2 \dots\dots\dots (2)$$

The n th term of a different sequence is $3n^2$
Nathan says that the 4th term of this sequence is 144.

- (b) Is Nathan right?
Show how you get your answer.

$$\begin{aligned} \text{Nth term} &= 3n^2 \\ \text{Put } n &= 4 \\ 3 \times 4^2 &= 48 \end{aligned}$$

Nathan is wrong! (1)

(Total for Question 25 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

Write your name here

Surname _____ Other names _____

Pearson Edexcel
Level 1 / Level 2
GCSE (9-1)

Centre Number

Candidate Number

Mathematics

Paper 3 (Calculator)

Tuesday 13 June 2017 – Morning
Time: 1 hour 30 minutes

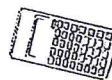
Paper Reference
1MA1/3F

Total Marks

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

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.
- Answer the questions in the spaces provided – there may be more space than you need.
- You must show all your working.
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- Calculators may be used.
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.



Information

- The total mark for this section is 80.
- 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.
- Keep an eye on time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 The table shows the lengths of five rivers.

River	Length (km)
Trent	297
Don	112
Severn	354
Thames	346
Mersey	113

- (a) Write down the rivers in order of length. Start with the shortest river.

Don, Mersey, Trent, Thames, Severn

(1)

Ami says,

"The River Thames is more than three times as long as the River Don."

- (b) Show that Ami is correct.

Ami is correct because

$112 \times 3 = 336$ km which is less than 346 km

(1)

(Total for Question 1 is 2 marks)

CALCULATOR

- 2 Cups are sold in packs and in boxes.

There are 12 cups in each pack.
There are 18 cups in each box.

Alison buys p packs of cups and b boxes of cups.

Write down an expression, in terms of p and b , for the total number of cups Alison buys.

$$12p + 18b$$

$$12p + 18b$$

$$12p + 18b$$

(Total for Question 2 is 2 marks)

- 3 Here are four digits.

5 6 1 9

- (i) Write down the smallest possible two digit number that can be made with two of the digits.

15

15

- (ii) Write down the three digit number closest to 200 that can be made with three of the digits.

196

(Total for Question 3 is 2 marks)

- 4 $\frac{4}{5}$ of a number is 32.

Find the number.

Let number be $\square$

$$\frac{4}{5} \times \square = 32$$

$$\square = \frac{32 \times 5}{4} = 40$$

40

(Total for Question 4 is 2 marks)

- 5 A path is made of white tiles and grey tiles.

$\frac{1}{4}$ of the tiles are white.

- (a) Write down the ratio of white tiles to grey tiles.

White : Grey

$$\frac{1}{4} : \frac{3}{4}$$

$$or 1 : 3$$

There is a total of 56 tiles.

- (b) Work out the number of grey tiles.

$$1 + 3 = 4$$

$$one\ part = \frac{1}{4} \times 56 = 14$$

$$grey\ tiles = 3 \times 14 = 42$$

42

(Total for Question 5 is 3 marks)

CALCULATOR

CALCULATOR

- 6 Here is a list of numbers.

12 15 14 17 22 19 13

Bridgit says,

"To work out the median you find the middle number, so the median of these numbers is 17"

Bridgit's answer is not correct.

- (a) What is wrong with Bridgit's method?

Bridgit did not put all numbers in order

(1)

- (b) Work out the range of the numbers in the list.

$$\text{Range} = 22 - 12 = 10$$

(2)

- (c) Work out the mean of the numbers in the list.

$$\frac{12 + 15 + 14 + 17 + 22 + 19 + 13}{7} = \frac{112}{7} = 16$$

(2)

(Total for Question 6 is 5 marks)

CALCULATOR

-83-

- 7 Priti is going to have a meal.
She can choose one starter and one main course from the menu.

Menu	
Starter	Main Course
Salad	Pasta
Fish	Rice
Melon	Burger

Write down all the possible combinations Priti can choose.

SP, SR, SB, FR, FB, MR, MB

(Total for Question 7 is 2 marks)

- 8 Joanne wants to buy a dishwasher.

The dishwasher costs £372.

Joanne will pay a deposit of £36.

She will then pay the rest of the cost in 4 equal monthly payments.

How much is each monthly payment?

$$\text{Advance deposit} = £36$$

$$\text{Balance } 372 - 36 = 336$$

$$\text{Monthly Payment} = \frac{336}{4} = £84$$

£84

(Total for Question 8 is 2 marks)

CALCULATOR

9 Davos is a cleaner.

The table shows information about the time it will take him to clean each of four rooms in a house.

Room	Time
Kitchen	2 hours
Sitting room	1 hour 40 minutes
Bedroom	$1\frac{1}{2}$ hours
Bathroom	45 minutes

Davos wants to clean all four rooms in one day.
He will have breaks for a total time of 75 minutes.

Davos is going to start cleaning at 9 a.m.

Will he finish cleaning by 4 p.m.?
You must show all your working.

$$\begin{array}{r} \text{Total time} = 2:00 \\ 1:40 \\ 1:30 \\ :45 \\ :75 \\ \hline 4\text{h } 190\text{ min} \end{array}$$

$$190\text{ min} = 3\text{ hours } 10\text{ min}$$

$$\text{Total Time } 4 + 3\text{h } 10\text{ Min}$$

He starts at 9:00 + 7h 10 min = 4:10 pm
No he will not be able to finish
by 4:00 pm.

CALCULATOR

10 ABC is a straight line.



The length AB is five times the length BC .
 $AC = 90$ cm.

Work out the length AB .

$$\begin{array}{l} \text{let } BC = x \\ AB = 5x \\ AC = x + 5x = 90 \\ 6x = 90 \\ x = 15 \end{array}$$

$x = 15$ cm
(Total for Question 10 is 3 marks)

11 $T = 4v + 3$

(a) Work out the value of T when $v = 2$

$$T = 4 \times 2 + 3$$

$$T = 11$$

$T = 11$ (2)

(b) Make v the subject of the formula $T = 4v + 3$

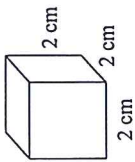
$$T - 3 = 4v$$

$$\frac{T - 3}{4} = v$$

$v = \frac{T - 3}{4}$ (2)
(Total for Question 11 is 4 marks)

CALCULATOR

- 12 The diagram shows a cube of side length 2 cm.



Vera says,

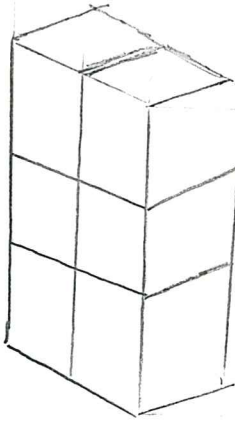
"The volume of any solid made with 6 of these cubes is 48 cm^3 ."

- (a) Is Vera correct?

You must show your working.

Volume of one cube = $2 \times 2 \times 2 = 8 \text{ cm}^3$
 6 Solid will have $6 \times 8 = 48 \text{ cm}^3$ Vera is right (2)

- (b) (i) Draw a cuboid that can be made with 6 of these cubes.
 Write the dimensions of the cuboid on your diagram.



(1)

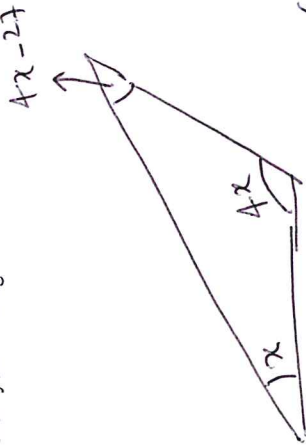
- (ii) Work out the surface area of your cuboid.

Surface area of top & bottom = $2(6 \times 4) = 48 \text{ cm}^2$
 " " " left & right = $2(4 \times 4) = 32 \text{ cm}^2$
 " " " front & rear = $2(6 \times 4) = 48 \text{ cm}^2$
 Total = 128 cm^2 (2)
 (Total for Question 12 is 5 marks)

CALCULATOR

- 13 The size of the largest angle in a triangle is 4 times the size of the smallest angle.
 The other angle is 27° less than the largest angle.

Work out, in degrees, the size of each angle in the triangle.
 You must show your working.



$$\begin{aligned} x &= 23 \\ 4x &= 4 \times 23 = 92 \\ 4x - 27 &= 92 - 27 \\ &= 65 \end{aligned}$$

(Sum of all angles equals 180°)

$$x + 4x + 4x - 27 = 180$$

$$9x = 180 + 27 = 207$$

$$x = \frac{207}{9} = 23 \dots 23^\circ, \dots 65^\circ, \dots 92^\circ$$

(Total for Question 13 is 5 marks)

CALCULATOR

- 14 Andy went on holiday to Canada.
His flights cost a total of £1500.
Andy stayed for 14 nights.
His hotel room cost \$196 per night.
Andy used wifi for 12 days.
Wifi cost \$5 per day.

The exchange rate was \$1.90 to £1.

- (a) Work out the total cost of the flights, the hotel room and wifi.
Give your answer in pounds.

$$\text{Flight cost} = £1500$$

$$\text{Hotel Room} = \frac{196 \times 14}{1.90} = £1444.21$$

$$\text{Wifi} = 5 \times 12 = \frac{60}{1.90} = £31.58$$

$$\text{Total Cost} = £1500 + £1444.21 + £31.58 = £2975.79$$

$$£2975.79$$

- (b) If there were fewer dollars to £1, what effect would this have on the total cost, in pounds, of Andy's holiday?

Then he would've paid more amount in £

(1)

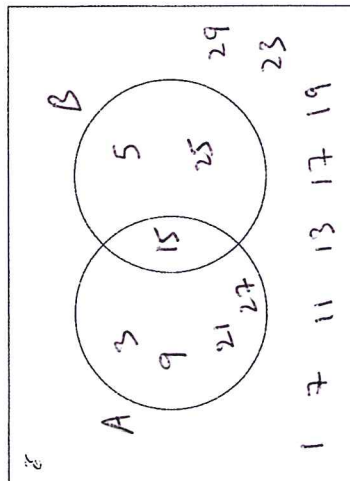
(Total for Question 14 is 6 marks)

CALCULATOR

-86-

- 15 $\mathcal{E} = \{\text{odd numbers less than } 30\}$
 $A = \{3, 9, 15, 21, 27\}$
 $B = \{5, 15, 25\}$

- (a) Complete the Venn diagram to represent this information.



(4)

A number is chosen at random from the universal set, $\mathcal{E}$.

- (b) What is the probability that the number is in the set $A \cup B$?

$$P(A \cup B) = \frac{7}{15}$$

$$\frac{7}{15}$$

(2)

(Total for Question 15 is 6 marks)

CALCULATOR

16 Solve the simultaneous equations

$$\begin{array}{l} 3x + y = -4 \\ 3x - 4y = 6 \end{array} \quad \begin{array}{l} \xrightarrow{\textcircled{1}} \\ \xrightarrow{\textcircled{2}} \end{array}$$

$$\begin{array}{r} \textcircled{1} - \textcircled{2} \\ 3x + y = -4 \\ 3x - 4y = 6 \\ \hline + \quad - \\ 5y = -10 \\ y = -2 \end{array}$$

Substitute $y = -2$ in $\textcircled{1}$

$$3x + -2 = -4$$

$$3x = -4 + 2 = -2$$

$$x = -\frac{2}{3}$$

$$x = -\frac{2}{3}$$

$$y = -2$$

(Total for Question 16 is 3 marks)

CALCULATOR

17 The table shows some information about the dress sizes of 25 women.

Dress size	Number of women	C.F
8	2	2
10	9	11
12	8	19
14	6	25

(a) Find the median dress size.

Median is the 13th value
which is 12

12 (1)

3 of the 25 women have a shoe size of 7.

Zoe says that if you choose at random one of the 25 women, the probability that she has either a shoe size of 7 or a dress size of 14 is $\frac{9}{25}$ because

$$\frac{3}{25} + \frac{6}{25} = \frac{9}{25}$$

(b) Is Zoe correct?

You must give a reason for your answer.

Zoe is wrong because she knows that 3 out of 25 have shoe size 7 but she does not know how many women have dress size 14.

(1)

(Total for Question 17 is 2 marks)

- 18 Daniel bakes 420 cakes.
He bakes only vanilla cakes, banana cakes, lemon cakes and chocolate cakes.

$\frac{2}{7}$ of the cakes are vanilla cakes.

35% of the cakes are banana cakes.

The ratio of the number of lemon cakes to the number of chocolate cakes is 4:5

Work out the number of lemon cakes Daniel bakes.

$$\text{Vanilla cakes} \quad \frac{2}{7} \times 420 = 120$$

$$\text{Banana cakes} = 35\% \text{ of } 420 = 0.35 \times 420 = 147$$

$$\text{Remaining} = 420 - (120 + 147) = 153$$

Lemon : chocolate

$$4 : 5 \quad 17$$

$$\text{Lemon cakes} = \frac{4}{9} \times 153 = 68$$

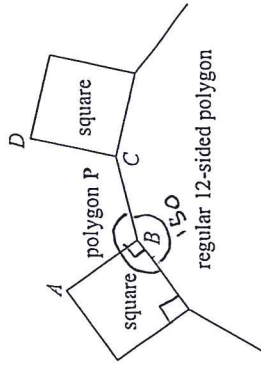
68 lemon cakes

(Total for Question 18 is 5 marks)

CALCULATOR

-88-

- 19 In the diagram, AB, BC and CD are three sides of a regular polygon P.



Show that polygon P is a hexagon.
You must show your working.

$$\text{On interior angle of 12 sided shape } \frac{(12-2) \times 180}{12} = 150$$

$$= 150$$

$$\text{Then outside angle} = 360 - 150$$

$$= 210$$

$$= 90 + 120$$

one Angle of a square
one angle of polygon P

interior

$$\text{One angle of hexagon} = \frac{(6-2) \times 180}{6} = 120$$

This shows that Polygon P is a hexagon

(Total for Question 19 is 4 marks)

CALCULATOR

20 The density of apple juice is 1.05 grams per cm^3 .

21

20 The density of apple juice is 1.05 grams per cm^3 .

The density of fruit syrup is 1.4 grams per cm^3 .

The density of carbonated water is 0.99 grams per cm^3 .

25 cm³ of apple juice are mixed with 15 cm³ of fruit syrup and 280 cm³ of carbonated water to make a drink with a volume of 320 cm³.

Work out the density of the drink.

Give your answer correct to 2 decimal places.

	Density	Volume
Apple Juice	1.05 g/cm ³	25 cm ³
Fruit Syrup	1.4 g/cm ³	15 cm ³
Carbonated water	0.99 g/cm ³	280 cm ³

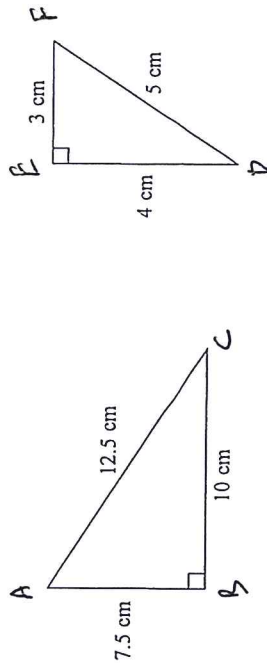
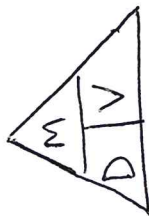
Mass of Apple Juice = $D \times V = 1.05 \times 25$
 $= 26.25$

fruit
syrup = 1.4×15
= 21

Carbonated water
24.45
- 0.99 x 280 = 277.2

$$\begin{aligned} \text{Total Mass} &= 324.45 \\ \text{Total Density} &= \frac{\text{Total Mass}}{\text{Total Volume}} = \frac{324.45}{320} = 1.01 \text{ g/cm}^3 \end{aligned}$$

(Total for Question 20 is 4 marks)



Show that these two triangles are mathematically similar.

$$\frac{AC}{DF} = \frac{12}{5} = 2.5 \text{ (scale factor)}$$

$$4 \times 2.5 = 10 = BC$$

$$5 \times 2.5 = 12.5 = AC$$

$$3 \times 2.5 = 7.5 = AB$$

This shows that $\triangle ABC$ is similar to $\triangle DEF$

(Total for Question 21 is 2 marks)

CALCULATOR

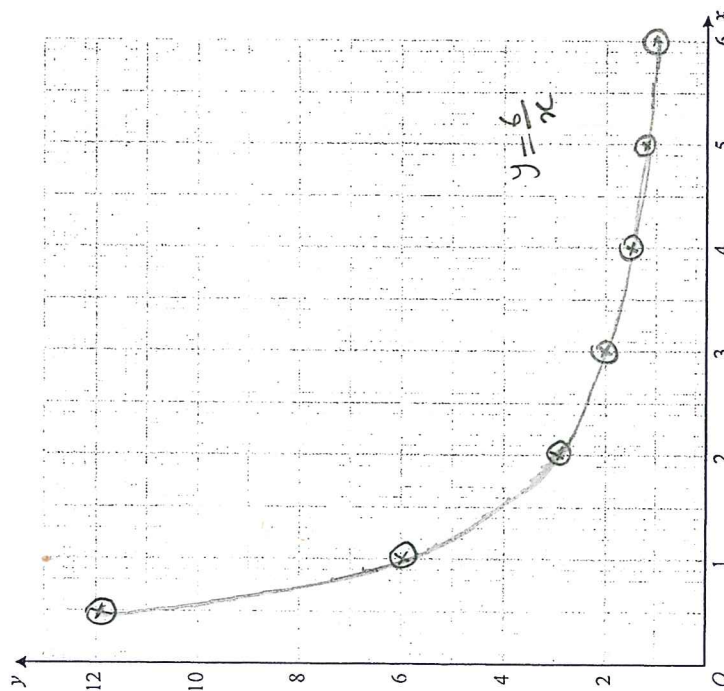
CALCULATOR

- 22 (a) Complete the table of values for $y = \frac{6}{x}$

x	0.5	1	1.5	2	3	4	5	6
y	12	6	4	3	2	1.5	1.2	1

(2)

- (b) On the grid below, draw the graph of $y = \frac{6}{x}$ for values of x from 0.5 to 6.



(2)
(Total for Question 22 is 4 marks)

CALCULATOR

- 23 Harley's house has a value of £160 000 correct to 2 significant figures.
(a) (i) Write down the least possible value of the house.

£ 155,000 (1)

- (ii) Write down the greatest possible value of the house.

£ 165,000 (1)

The value of Rita's house increased by 5%.
Her house then had a value of £210 000.

- (b) Work out the value of Rita's house before the increase.

$$\begin{aligned} &\text{due to increase of } 5\% \\ &\text{multiplier} = 1.05 \\ &\text{The original value of house} = \frac{210\,000}{1.05} \\ &= £200,000 \end{aligned}$$

£ 200,000 (2)

(Total for Question 23 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS