

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

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

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Thursday 8 November 2018

Morning (Time: 1 hour 30 minutes)

Paper Reference **1MA1/2F**

Mathematics

Paper 2 (Calculator)

Foundation Tier

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of 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.
- 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 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.

Turn over ►

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6/7/17/17/1/

.CG Maths.
Worked Solutions


Pearson

Please note that these worked solutions have neither been provided nor approved by Pearson Education and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

Any writing in blue should be written in the exam.

Anything written in green in a rectangle doesn't have to be written in the exam.

If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 Write down the value of the 4 in the number 542.3

The 4 is in the tens place

40

(Total for Question 1 is 1 mark)

- 2 Write down a square number that is also an odd number.

A number which is the result of multiplying a whole number greater than 0 by itself and which ends in a 1, 3, 5, 7 or 9

1

(Total for Question 2 is 1 mark)

- 3 (a) Change 4560 g into kg.

1 kg = 1000 g. So dividing the 4560 by 1000 converts it to kg

4.56

(1)

kg

- (b) Change 7.3 m into mm.

1 m = 1000 mm. So multiplying the 7.3 by 1000 converts it to mm

7300

(1)

mm

(Total for Question 3 is 2 marks)

- 4 Work out the cube root of 64

Type into the calculator

4

(Total for Question 4 is 1 mark)

- 5 Write 0.31 as a fraction.

Type into the calculator

$\frac{31}{100}$

(Total for Question 5 is 1 mark)

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6 Here are four fractions.

$$\frac{3}{4} \quad \frac{5}{7} \quad \frac{19}{25} \quad \frac{11}{15}$$

$$0.75 \quad 0.71... \quad 0.76 \quad 0.73...$$

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

Formatting each fraction as a decimal to 2 decimal places so that they can be more easily compared

$$\frac{5}{7}, \frac{11}{15}, \frac{3}{4}, \frac{19}{25}$$

(Total for Question 6 is 2 marks)

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7 (a) Simplify $3m - m - m + 3m$

$$3 - 1 - 1 + 3 = 4. \text{ So } 3m - m - m + 3m = 4m$$

$$4m$$

(1)

(b) Simplify $2 \times n \times p \times 4$

$$\text{Multiplication can be done in any order. } 2 \times 4 = 8 \text{ then } 8 \times n \times p = 8np$$

$$8np$$

(1)

(Total for Question 7 is 2 marks)

8 A map has a scale of 1 cm to 14 km.

On the map, the distance between Manchester and London is 18.8 cm.

What is the real distance, in km, between Manchester and London?

$$18.8 \times 14 \leftarrow \text{The number of km is 14 times the number of cm}$$

$$263.2 \text{ km}$$

(Total for Question 8 is 2 marks)

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9 (a) The n th term of a sequence is $3n + 4$

Explain why 21 is not a term of this sequence.

7, 10, 13, 16, 19, 22

Using table mode on the calculator. Define $f(x) = 3x + 4$. Start: 1. End: 30. Step: 1. This lists out the first 30 terms of the sequence. It goes past 21

(2)

(b) Here are the first three terms of a different sequence.



Write down two numbers that could be the 4th term and the 5th term of this sequence. Give the rule you have used to get your numbers.

8, 16

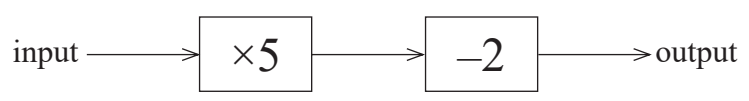
$4 \times 2 = 8$ then $8 \times 2 = 16$

Keep doubling

(2)

(Total for Question 9 is 4 marks)

10 Here is a number machine.



(a) Work out the **output** when the input is 8

8×5

Multiplying the input by 5 gives 40

$40 - 2$

Then subtracting 2 from the 40 gives the output of 38

38

(1)

(b) Work out the **input** when the output is 28

$28 + 2$

Doing the opposite operations in the opposite order. Adding 2 to the output of 28 gives 30

$30 \div 5$

Then dividing the 30 by 5 gives the input of 6

6

(2)

(Total for Question 10 is 3 marks)

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- 11 Adam gets a bonus of 30% of £80
Katy gets a bonus of £28

Work out the difference between the bonus Adam gets and the bonus Katy gets.

$\frac{30}{100} \times 80$ ← Putting the 30% over 100 converts it to a fraction, which finds that 30% of £80 is £24 when multiplied

$28 - 24$ ← Subtracting the £24 Adam gets from the £28 Katy gets works out that the difference is £4

£ 4

(Total for Question 11 is 3 marks)

- 12 There are 49 counters in a bag.

20 of the counters are red.
The rest of the counters are blue.

One of the counters is taken at random.

Find the probability that the counter is blue.

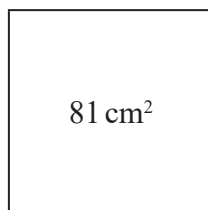
$49 - 20$ ← Subtracting the 20 red counters from the total 49 counters works out that there are 29 blue counters

29 out of the 49 counters are blue

$\frac{29}{49}$

(Total for Question 12 is 2 marks)

13 A square has an area of 81 cm^2



(a) Find the perimeter of the square.

$$\sqrt{81}$$

Area of square = length^2 . So square rooting the area finds that the side length is 9 cm

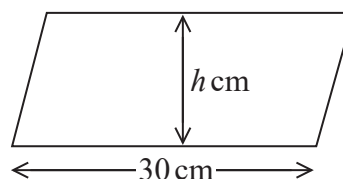
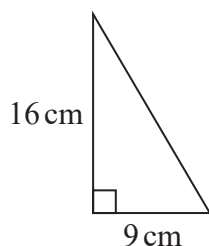
$$9 \times 4$$

Perimeter is the total of all the outside sides. Multiplying the 9 cm length of one of the sides by 4 works out that the total length of all four sides is 36 cm

$$36$$

.....cm
(2)

The diagram shows a right-angled triangle and a parallelogram.



The area of the parallelogram is 5 times the area of the triangle.
The perpendicular height of the parallelogram is h cm.

(b) Find the value of h .

$$\frac{1}{2} \times 9 \times 16$$

Area of triangle = $\frac{1}{2} \times \text{base} \times \text{height}$. So the area of the triangle is 72 cm^2

$$72 \times 5$$

Multiplying the area of the triangle by 5 works out that the area of the parallelogram is 360 cm^2

$$30 \times h = 360$$

Area of parallelogram = $\text{base} \times \text{height}$

Dividing both sides by 30 gets h on its own

$$h = \dots\dots\dots 12$$

(3)

(Total for Question 13 is 5 marks)

14 Victoria throws an ordinary fair 6-sided dice once.

She says,

“The probability of getting a 3 is half the probability of getting a 6”

(a) Is Victoria correct?

You must explain your answer.

No as the probability of both is 1/6

1 out of the 6 faces is a 3 and 1 out of the 6 faces is a 6

(1)

Andy throws the dice twice.

He says,

“The probability of getting a 6 on both throws is $\frac{2}{6}$ ”

(b) Is Andy correct?

You must explain your answer.

No as the probability is 1/36

6 AND 6. AND means to multiply the probabilities.
1 out of the 6 faces is a 6 and $1/6 \times 1/6 = 1/36$

(1)

Indre throws the dice once.

She also throws a coin to get Heads or Tails.

(c) List all the possible outcomes she can get.

H1, H2, H3, H4, H5, H6, T1, T2, T3, T4, T5, T6

H stands for heads and T stands for tails. Systematically listing the possible outcomes

(2)

(Total for Question 14 is 4 marks)

- 15 Remi invests £600 for 5 years in a savings account.
By the end of the 5 years he has received a total of £75 simple interest.

Work out the annual rate of simple interest.

$$75 \div 5$$

It is simple interest so the interest is the same each year. Dividing the £75 interest by the 5 years works out that £15 interest is received each year

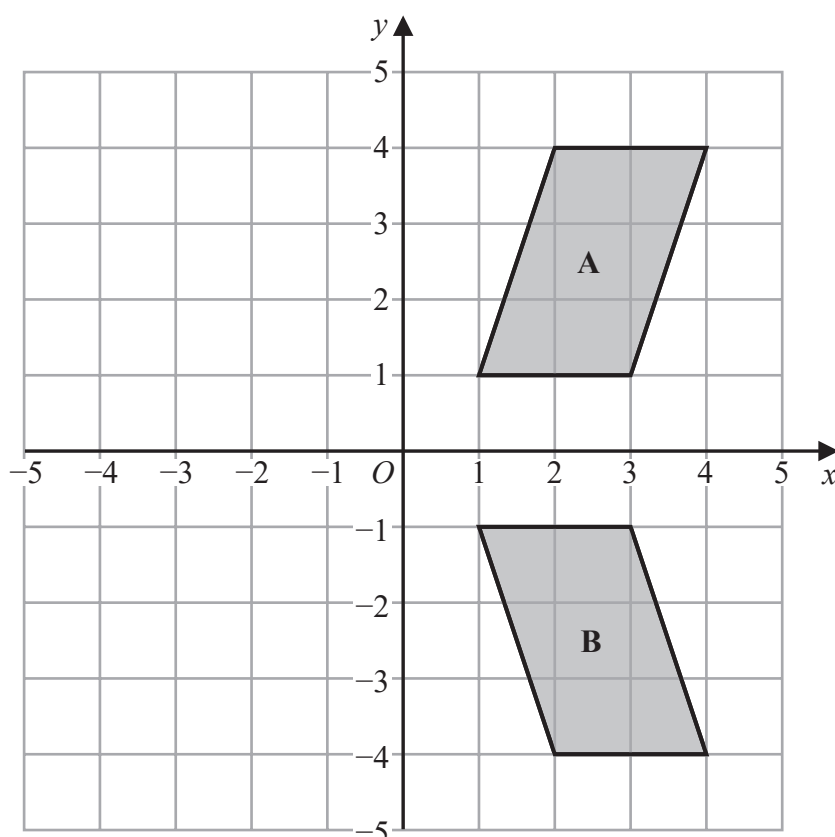
$$\frac{15}{600} \times 100$$

Putting the £15 interest over the original £600 expresses the interest as a fraction. Multiplying this by 100 converts it to a percentage

..... 2.5 %

(Total for Question 15 is 3 marks)

16



Describe fully the single transformation that maps shape A onto shape B.

..... Reflection in the x-axis

B is a mirror image of A. The line halfway between both shapes is the x-axis

(Total for Question 16 is 2 marks)

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17 Adrian is going to make concrete.
He is going to use

- 180 kg of cement
- 375 kg of sand
- 1080 kg of stone

Cement, sand and stone are sold in bags.

1 bag cement	1 bag sand	1 bag stone
25 kg	22.5 kg	50 kg

Adrian already has

- 10 bags of cement
- 20 bags of sand
- 20 bags of stone

Work out what bags he needs to buy to make the concrete.

$10 \times 25 = 250$ ← Multiplying the 10 bags of cement by the 25 kg in each bag works out that there is 250 kg of cement. This is more than 180 kg of cement so no more bags of cement are needed

$20 \times 22.5 = 450$ ← Multiplying the 20 bags of sand by the 22.5 kg in each bag works out that there is 450 kg of sand. This is more than 375 kg of sand so no more bags of sand are needed

20×50 ← Multiplying the 20 bags of stone by the 50 kg in each bag works out that there is 1000 kg of stone. This is less than 1080 kg of stone so more bags of stone are needed

$1080 - 1000$ ← Subtracting the 1000 kg he has from the 1080 kg needed works out that another 80 kg of stone is needed

$80 \div 50$ ← Dividing the 80 kg extra needed by the 50 kg in each bag works out that 1.6 bags of stone are needed

2 bags of stone ← There needs to be a whole number of bags so rounding up to 2 bags of stone as 1 bag of stone is not enough

(Total for Question 17 is 3 marks)

- 18 Bill wants to increase 150 by 3%
He writes down

$$150 \times 1.3 = 195$$

Bill's method is wrong.

- (a) Explain why.

He is increasing by 30%

$$1.3 \times 100 = 130\% \text{ so it is an increase of } 30\%$$

(1)

Sally wants to decrease 150 by 3%

- (b) Complete this statement to show how Sally can decrease 150 by 3%

$$150 \times 0.97 = 145.5$$

100% - 3% = 97%. $97 \div 100 = 0.97$,
which when multiplied by decreases by 3%

(1)

(Total for Question 18 is 2 marks)

- 19 (a) Solve $3(x - 4) = 12$

$$x - 4 = 4 \leftarrow \text{Dividing both sides by 3 eliminates the 3 on the left. The brackets are no longer needed}$$

Adding 4 to both sides eliminates the -4 on the left and gets x on its own

$$x = 8$$

(2)

- (b) Factorise fully $9b - 3b^2$

3b is the highest common factor of 9b and $-3b^2$. Bringing 3b out as a factor, dividing both 9b and $-3b^2$ by 3b, and leaving the result in a bracket

$$3b(3 - b)$$

(2)

(Total for Question 19 is 4 marks)

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20 $\mathcal{E} = \{\text{even numbers between 1 and 25}\}$

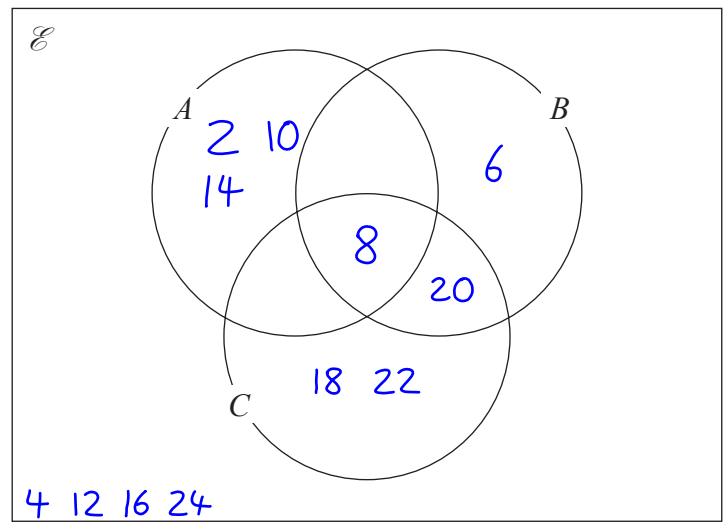
$A = \{2, 8, 10, 14\}$

$B = \{6, 8, 20\}$

$C = \{8, 18, 20, 22\}$

8 is in A, B and C. 20 is in B and C

(a) Complete the Venn diagram for this information.



(4)

A number is chosen at random from \mathcal{E} .

(b) Find the probability that the number is a member of $A \cap B$.

The 8 is in both A and B so is in the intersection of A and B.
1 out of the 12 numbers is in the intersection of A and B

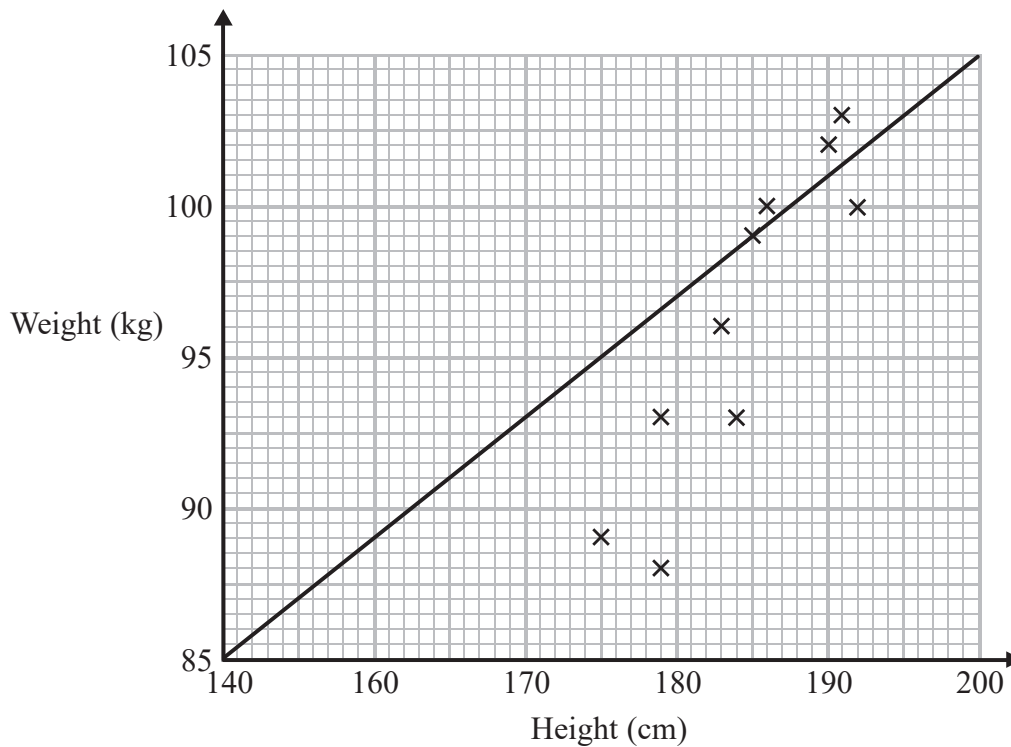
$\frac{1}{12}$

(2)

(Total for Question 20 is 6 marks)



- 21 Sean has information about the height, in cm, and the weight, in kg, of each of ten rugby players. He is asked to draw a scatter graph and a line of best fit for this information. Here is his answer.



Sean has plotted the points accurately.

Write down two things that are wrong with his answer.

- The line of best fit is wrong ← It doesn't fit the correlation and has been forced through the origin
- 150 is missing on the horizontal scale ← It goes from 140 to 160 and misses 150

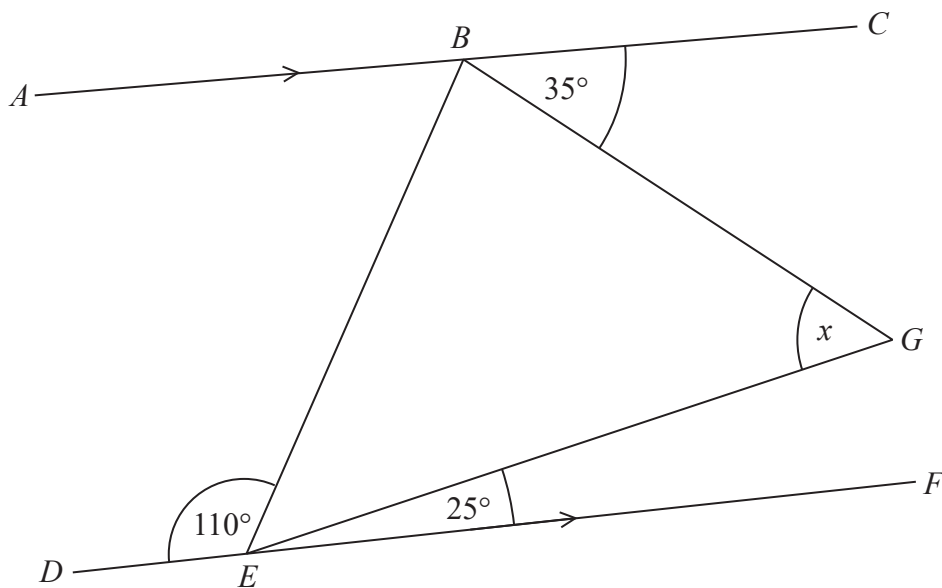
(Total for Question 21 is 2 marks)

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22 BEG is a triangle.



ABC and DEF are parallel lines.

Work out the size of angle x .

Give a reason for each stage of your working.

$$180 - 110 - 25$$

Angle $BEG = 45^\circ$ as angles around a point on a straight line add to 180°

Subtracting angle DEB and angle GEF from 180° leaves angle BEG

Angle EBC is 110° as alternate angles are equal ← Angle DEB and angle EBC are alternate angles

$$110 - 35$$

Angle $EBG = 75^\circ$

Subtracting angle CBG from angle EBC leaves angle EBG

$$180 - 45 - 75$$

$x = 60^\circ$ as angles in a triangle add to 180°

Subtracting angle EBG and angle BEG from 180° leaves angle x

..... 60 °

(Total for Question 22 is 4 marks)

- 23 Northern Bank has two types of account.
Both accounts pay compound interest.

Cash savings account
Interest
2.5% per annum

Shares account
Interest
3.5% per annum

Ali invests £2000 in the cash savings account.
Ben invests £1600 in the shares account.

- (a) Work out who will get the most interest by the end of 3 years.
You must show all your working.

$$\frac{100 + 2.5}{100}$$

Adding the 2.5% to 100% expresses the percentage the cash savings account increases to each year. Putting this over 100 converts it to the decimal multiplier 1.025

$$2000 \times 1.025^3$$

Multiplying the £2000 by 1.025^3 increases the £2000 by 2.5% 3 times. So Ali has £2153.78 at the end of 3 years

$$2153.78 - 2000 = 153.78$$

Subtracting the original £2000 from the £2153.78 Ali has at the end of 3 years works out that Ali receives £153.78 interest

$$\frac{100 + 3.5}{100}$$

Adding the 3.5% to 100% expresses the percentage the shares account increases to each year. Putting this over 100 converts it to the decimal multiplier 1.035

$$1600 \times 1.035^3$$

Multiplying the £1600 by 1.035^3 increases the £1600 by 3.5% 3 times. So Ben has £1773.95 at the end of 3 years

$$1773.95 - 1600 = 173.95$$

Subtracting the original £1600 from the £1773.95 Ben has at the end of 3 years works out that Ben receives £173.95 interest

Ben

Ben receives £173.95 interest, which is more than the £153.78 Ali receives

(4)

In the 3rd year the rate of interest for the shares account is changed to 4% per annum.

- (b) Does this affect who will get the most interest by the end of 3 years?
Give a reason for your answer.

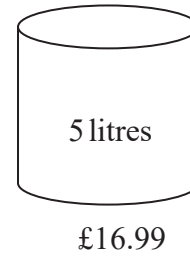
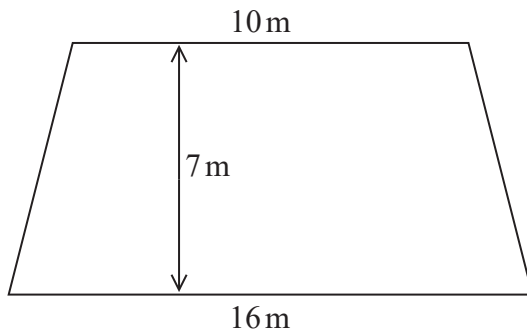
No as Ben will get more interest

Ben had the most interest. Giving Ben more interest will still mean that Ben has the most interest. So there is no affect

(1)

(Total for Question 23 is 5 marks)

24 The diagram shows a floor in the shape of a trapezium.



John is going to paint the floor.

Each 5 litre tin of paint costs £16.99
1 litre of paint covers an area of 2 m^2

John has £160 to spend on paint.

Has John got enough money to buy all the paint he needs?
You must show how you get your answer.

$$\frac{1}{2}(10+16) \times 7$$

Area of trapezium = $\frac{1}{2}(a + b) \times h$, where a and b are the parallel sides and h is the distance between them. So the area of the floor is 91 m^2

$$91 \div 2$$

Dividing the area of the floor by the 2 m^2 covered by each litre of paint works out that 45.5 litres of paint are needed

$$45.5 \div 5$$

Dividing the 45.5 litres of paint needed by the 5 litres in each tin works out that 9.1 tins of paint are needed. A whole number needs to be bought so this is rounded up to 10

$$10 \times 16.99 = 169.90$$

Multiplying the 10 tins needed by the cost of each tin works out that they will cost £169.90

No

The £169.90 needed is more than the £160 John has

(Total for Question 24 is 5 marks)

- 25 A is the point with coordinates $(5, 9)$
 B is the point with coordinates $(d, 15)$

The gradient of the line AB is 3

Work out the value of d .

$$\frac{6}{x} = 3$$

Gradient = (change in y)/(change in x). y changes from 9 to 15 so the change in y is 6. Let x be the change in x

$$x = 2$$

$6/2 = 3$. So the change in x must be 2

2 more than 5 is 7

7

(Total for Question 25 is 3 marks)

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26 (a) Expand and simplify $(5x + 2)(2x - 3)$

$10x^2 - 15x + 4x - 6$

$5x \times 2x = 10x^2$
 $5x \times -3 = -15x$
 $2 \times 2x = 4x$
 $2 \times -3 = -6$

$-15x + 4x = -11x$

$10x^2 - 11x - 6$

(2)

(b) Factorise $x^2 + 4x + 3$

3 and 1 add to the 4 and multiply to the 3. Putting these in brackets with x

$(x + 3)(x + 1)$

(2)

(Total for Question 26 is 4 marks)

27 (a) Write the number 0.00007547 in standard form.

Multiplying by ten 5 times gives 7.547, which is at least 1 and less than 10. Then multiplying by 10^{-5} to keep it equal

7.547×10^{-5}

(1)

(b) Write 3.42×10^4 as an ordinary number.

3.4200

$\times 10^4$ means to multiply by ten 4 times

34200

(1)

(c) Work out $\frac{2.3 \times 10^4 \times 6.7 \times 10^3}{5 \times 10^{-8}}$

Type into calculator

3.082×10^{15}

(2)

(Total for Question 27 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS