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

Wednesday 6 November 2024

Morning (Time: 1 hour 30 minutes)

Paper reference **1MA1/1F**

Mathematics

Paper 1 (Non-Calculator)
Foundation Tier

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **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 not be used**.

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.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

.CG Maths.
Worked Solutions

Pearson

1 Write 25% as a decimal.

Dividing any percentage by 100 converts it to a decimal. This can be done by moving the decimal point two times to the left

0.25

(Total for Question 1 is 1 mark)

2 Here are the first four even numbers.

2   4   6   8

Find the 10th even number.

Counting in twos until the 10th even number is found. 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

20

(Total for Question 2 is 1 mark)

3 Change 15 centimetres into millimetres.

There are 10 mm in 1 cm. So multiplying the 15 cm by 10 converts it into millimetres

150 millimetres

(Total for Question 3 is 1 mark)

4 Write down the multiple of 9 that is between 20 and 30

9 × 3 = 27, so 27 is a multiple of 9 between 20 and 30

27

(Total for Question 4 is 1 mark)

5 Work out 500 + 145

500
+ 145
645

645

(Total for Question 5 is 1 mark)

.CG Maths.

6 Javid hires a car for 10 days.
He pays £45 for each day.
He also pays £30 for insurance.

Javid pays with ten £50 notes.
Work out how much change he should get.

$50 \times 10 = 500$ ← Multiplying the £50 by 10 works out that Javid pays £500

45×10 ← Multiplying the £45 by 10 works out that it costs £450 for 10 days

$\begin{array}{r} 450 \\ + \ 30 \\ \hline 480 \end{array}$ ← Adding the £30 for insurance to the £450 works out that it costs £480 in total to hire for 10 days and the insurance

$\begin{array}{r} 5^{1}0\ 0 \\ - \ 4\ 8\ 0 \\ \hline 2\ 0 \end{array}$ ← Subtracting the £480 cost from the £500 paid works out that Javid should get £20 change

£ .... 20 ....

(Total for Question 6 is 3 marks)

7 Here is an accurately drawn triangle.

P ————————— 9.5 cm ————————— Q
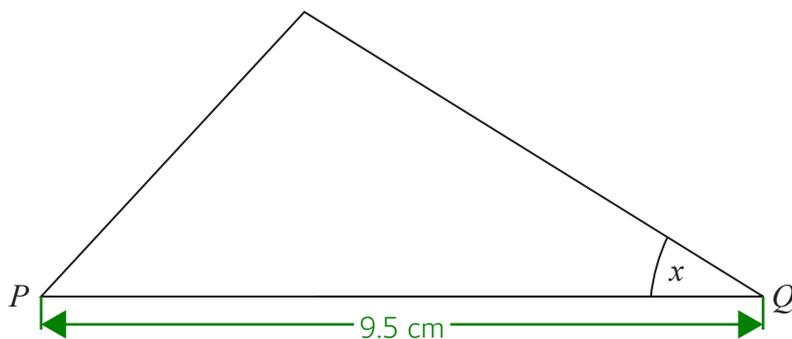
(a) Measure the length of the side *PQ*.
Give your answer in centimetres.

Measured using a ruler

.................9.5................. centimetres

(1)

(b) What type of angle is the angle marked *x*?

It is less than 90°

.................Acute.................

(1)

(c) Measure the size of the angle marked *x*.

Measured using a protractor ———→ ....32................. °

(1)

(Total for Question 7 is 3 marks)

.CG Maths.

8
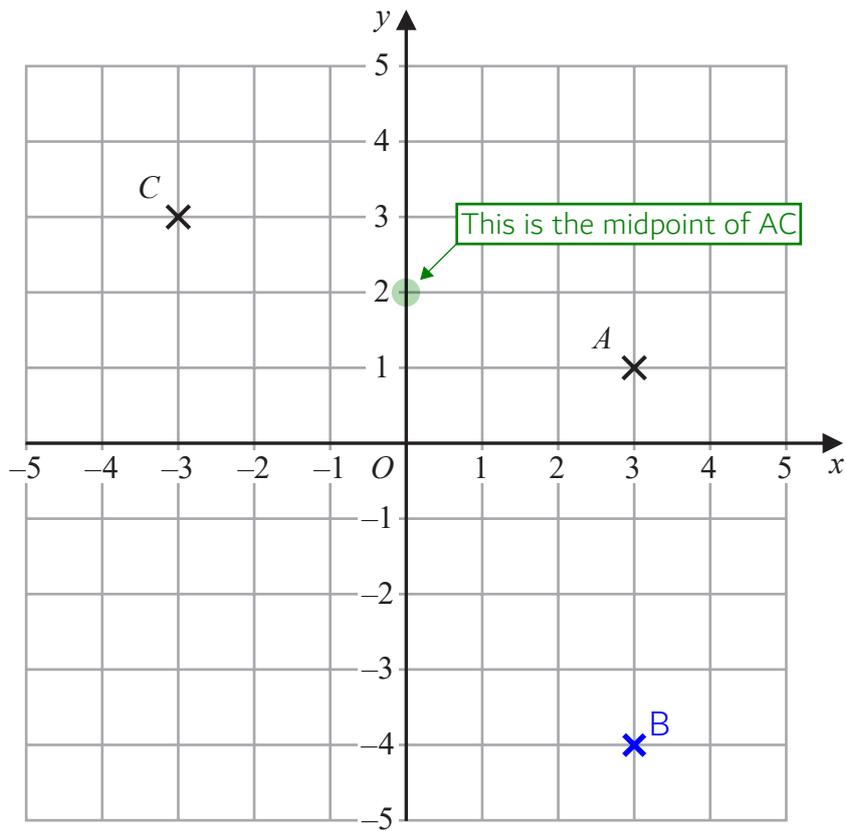
(a) Write down the coordinates of point *A*.

(........3........ , ...1........)

(1)

(b) On the grid, mark with a cross (×) the point (3, −4)
Label this point *B*.

(1)

(c) Write down the coordinates of the midpoint of *AC*.

(........0........ , ...2........)

(1)

(Total for Question 8 is 3 marks)

9 Milly collects stickers of sports players.
She only has stickers of tennis players, football players and cricket players.

The incomplete bar chart shows some information about the number of stickers Milly has.

Number of stickers
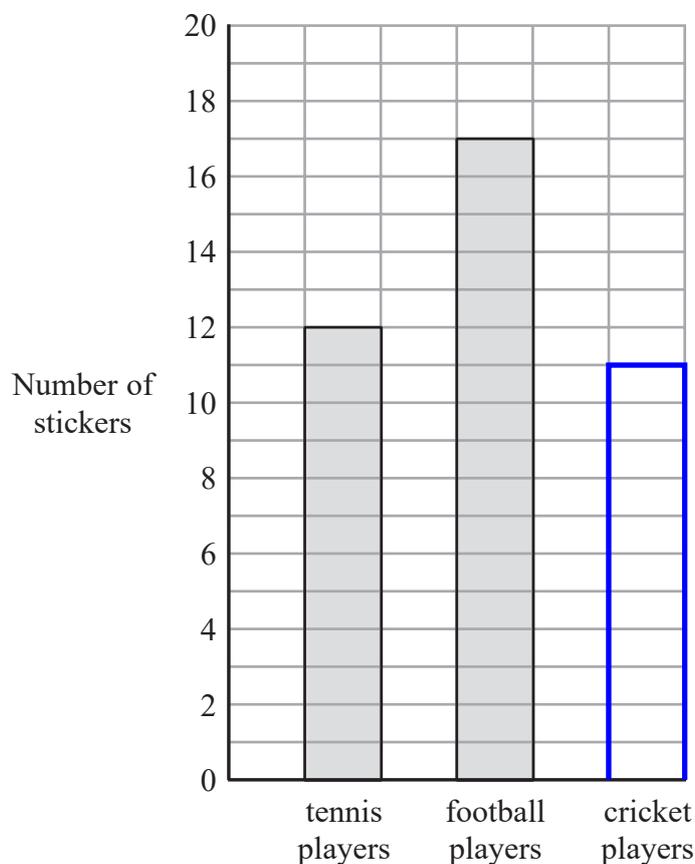
Milly has a total of 40 stickers.

(a) Complete the bar chart.

12
+ 17
─────
29

Adding the 12 for tennis players and the 17 for football players works out that there are 29 stickers on the bar chart so far

⁴³⁰
- 2 9
─────
1 1

Subtracting the 29 stickers on the bar chart so far from the total of 40 stickers works out that there must be 11 for cricket players

(3)

(b) What fraction of the 40 stickers are stickers of tennis players?
Give your fraction in its simplest form.

$\frac{12}{40}$

12 out of the 40 stickers are of tennis players

$\frac{6}{20}$

Simplifying the fraction by dividing both the numerator and denominator by 2

Simplifying the fraction by dividing both the numerator and denominator by 2. It cannot go simpler as the numerator and denominator cannot be divided by the same amount to get smaller whole numbers

$\frac{3}{10}$

(2)

.CG Maths.

Ewan also collects stickers.
He only has large stickers and small stickers.

For Ewan's stickers,

the number of large stickers : the number of small stickers = 5 : 4

(c) Write down the fraction of Ewan's stickers that are large stickers.

5 + 4 = 9 parts in total in the ratio. 5 out of these 9 parts are for large stickers → $\dfrac{5}{9}$

....

(1)

(d) Write the ratio 5 : 4 in the form n : 1

Both sides of the ratio must be divided by 4 to get 1 on the right. 5 does not divide by 4 to give a whole number so can be left as 5/4 instead of converting it to a decimal → $\dfrac{5}{4}$: 1

....

(1)

(Total for Question 9 is 7 marks)
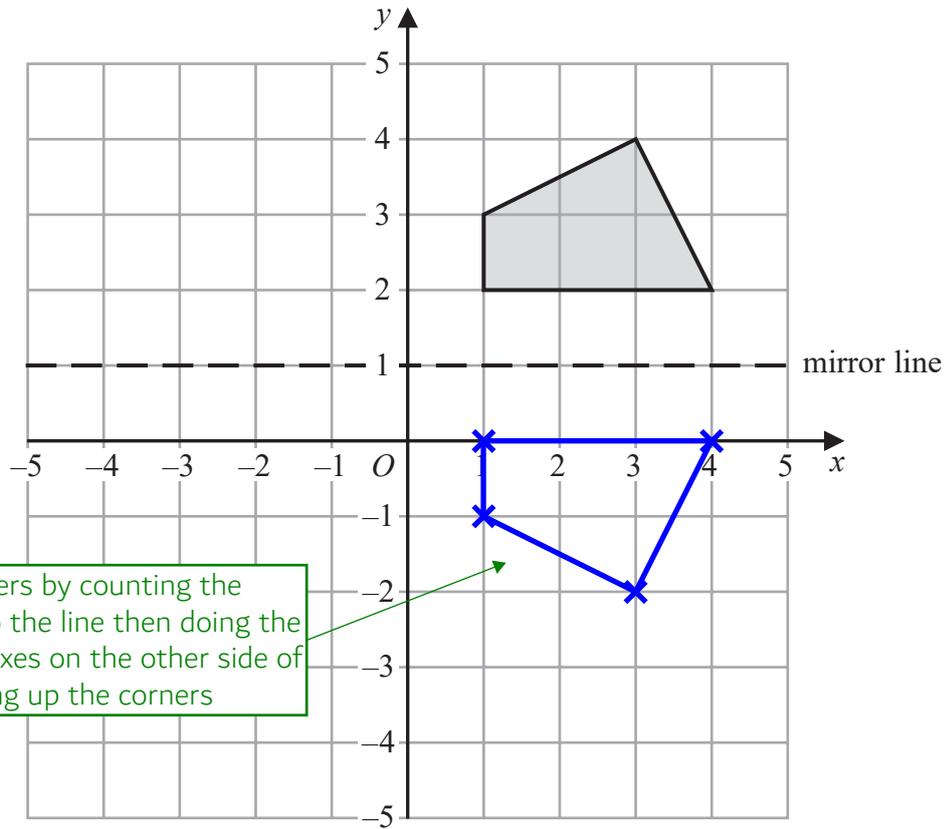
.CG Maths.

10

(a) On the grid, reflect the shaded shape in the mirror line.

(2)

(b) Write down the equation of the mirror line.

All the y-coordinates of every point on the line is 1 ➔ $y = 1$

(1)

(Total for Question 10 is 3 marks)

.CG Maths.

11 500 people were asked what type of film they liked best.

280 of the 500 people were adults.
100 of the adults said they liked action films best.
80 of the children said they liked thriller films best.

150 of the people said they liked action films best.
200 of the people said they liked comedy films best.

(a) Complete the two-way table.

	Comedy	**Thriller**	**Action**	**Total**
Adults	110 J	70 I	100 B	280 A
Children	90 K	80 C	50 H	220 F
Total	200 E	150 G	150 D	500

(3)

One of these 500 people is chosen at random.

(b) Find the probability that this person is an adult who said they liked action films best.

100 out of the 500 people were adults who said they liked action films best ⟶ $\frac{100}{500}$

(2)

(Total for Question 11 is 5 marks)

A: 280 were adults.
B: 100 of the adults said they liked action films best.
C: 80 of the children said they liked thriller films best.
D: 150 of the people said they liked action films best.
E: 200 of the people said they liked comedy films best.
F: 500 - 280 = 220.
G: 200 + 150 = 350 then 500 - 350 = 150.
H: 150 - 100 = 50.
I : 150 - 80 = 70.
J: 70 + 100 = 170 then 280 - 170 = 110.
K: 200 - 110 = 90.

.CG Maths.

12 Olly was asked to work out $5 - 3 \times 4$

Olly wrote $5 - 3 = 2$
He then worked out 2×4

Explain what is wrong with Olly's method.

Should do the multiplication first

The order of operations (BIDMAS) should be followed

(Total for Question 12 is 1 mark)

13 Here is a number machine.

input ⟶ [+ 5] ⟶ [÷ 2] ⟶ output

(a) Find the output when the input is 11

11 + 5 ← First adding the 5 to the input gives 16

16 ÷ 2 ← Then dividing the 16 by 2 gives the output of 8

8

(2)

Here is a different number machine.

input ⟶ [- 3] ⟶ [× 4] ⟶ output

When the input is 10, the output is 28

(b) Complete this number machine.

28 ÷ 4 = 7 ← Going backward from the output by doing the opposite of multiplying by 4 (which is dividing by 4) works out that it must be 7 after the first step in the number machine. Subtracting 3 from the input of 10 gives this 7

(2)

(Total for Question 13 is 4 marks)

.CG Maths.

14 Here is a cuboid of length 10 cm and width 4 cm.

height

4 cm

10 cm

The cuboid has a volume of 200 cm^3

(a) Work out the height of the cuboid.

$10 \times 4 \times h = 200$ ← Volume of cuboid = length × width × height. The length is 10 cm, the width is 4 cm and let h be the height. Multiplying these expresses the volume, which must be equal to the value of the volume 200 cm^3

$4 \times h = 20$ ← Dividing both sides by 10 eliminates the 10 on the left

Dividing both sides by 4 eliminates the 4 on the left and gets h = 5 → 5 .... cm

(2)

Here is a different cuboid.

3 cm

5 cm

6 cm

(b) Work out the total surface area of this cuboid.

$6 \times 5 = 30$ ← This works out that the area of the top face and the area of the bottom face are each 30 cm^2

$6 \times 3 = 18$ ← This works out that the area of the front face and the area of the back face are each 18 cm^2 ← Area of rectangle = length × width

$5 \times 3 = 15$ ← This works out that the area of the left face and the area of the right face are each 15 cm^2

30
$+\,30$
$+\,18$ ← Adding the areas of the top, bottom, front, back, left and right faces works out the surface area
$+\,18$
$+\,15$
$+\,15$ .... 126 cm^2
$\overline{126}$
$_{2}$

(3)

(Total for Question 14 is 5 marks)

.CG Maths.

Turn over ▶

15 (a) Factorise $6a + 15$

3 is the highest common factor of 6a and 15. Bringing 3 out as a factor, dividing both terms by 3 and leaving the result in a bracket → $3(2a + 5)$

(1)

(b) Solve $4(3y + 1) = 28$

$3y + 1 = 7$ ← Dividing both sides by 4 eliminates the 4 on the left. The brackets can then be ignored as they now do not make any difference

$3y = 6$ ← Subtracting 1 from both sides eliminates the +1 on the left and gets the y term on its own

Dividing both sides by 3 eliminates the 3 on the left and gets y on its own →

$y =$ 2

(3)

(Total for Question 15 is 4 marks)

16 1 cup of tea and 1 cup of coffee cost £4.50
3 cups of tea and 1 cup of coffee cost £8.50

Let T be the cost of 1 cup of tea and let C be the cost of 1 cup of coffee

Work out the total cost of 4 cups of tea and 3 cups of coffee.
You must show all your working.

$T + C = 4.50$ ← 1 cup of tea and 1 cup of coffee cost £4.50. This forms the 1st equation

$3T + C = 8.50$ ← 3 cups of tea and 1 cup of coffee cost £8.50. This forms the 2nd equation

$2T = 4$ ← Subtracting the 1st equation from the 2nd equation cancels out C and leaves an equation just in terms of T. 3T - T = 2T and C - C = 0 and 8.50 - 4.50 = 4

$T = 2$ ← Dividing both sides by 2 eliminates the 2 on the left and gets T on its own. So the cost of 1 cup of tea is £2

$2 + C = 4.50$ ← Substituting £2 for T in the 1st equation

$C = 2.50$ ← Subtracting 2 from both sides eliminates the 2 on the left and gets C on its own. So the cost of 1 cup of coffee is £2.50

$4 × 2 = 8$ ← This works out that the cost of 4 cups of tea is £8

$$\begin{array}{r} 2.50 \\ \times\ \ \ 3 \\ \hline 7.50 \end{array}$$ ← This works out that the cost of 3 cups of coffee is £7.50

$$\begin{array}{r} +8.00 \\ \hline 15.50 \end{array}$$ ← Adding the cost of the 4 cups of tea to the cost of 3 cups of coffee works out that the total cost is £15.50

£ 15.50

(Total for Question 16 is 5 marks)

.CG Maths.

17 Gita wants to make 24 litres of green paint.
She is going to mix blue paint, yellow paint and white paint in the ratio 4 : 3 : 1

She has

           12 litres of blue paint
            7 litres of yellow paint
            5 litres of white paint.

Does Gita have enough blue paint, yellow paint and white paint to make 24 litres of green paint?
You must show how you get your answer.

4 + 3 + 1 ← This works out that there are 8 parts in total in the ratio, which represent the total 24 litres of green paint

24 ÷ 8 = 3 ← Dividing the 24 litres by the 8 parts of the ratio works out that 1 part of the ratio is worth 3 litres. So there needs to be 3 litres of white paint. The 5 litres of white paint she has is enough

3 × 4 = 12 ← Multiplying the value of 1 part of the ratio by the 4 parts which represent the blue paint works out that 12 litres of blue paint is needed. The 12 litres of blue paint she has is enough

3 × 3 = 9 ← Multiplying the value of 1 part of the ratio by the 3 parts which represent the yellow paint works out that 9 litres of yellow paint is needed. The 7 litres of yellow paint she has is not enough

No ← She does not have enough yellow paint as she needs 9 litres of yellow and only has 7 litres of yellow

(Total for Question 17 is 3 marks)

.CG Maths.

18 Work out   818.4 ÷ 1.2

$$12 \overline{)8\ ^8 1\ ^9 8\ ^2 4} \quad \begin{array}{c} 0\ 6\ 8\ 2 \end{array}$$

Multiplying both the 818.4 and the 1.2 by 10 eliminates the decimal on the 1.2. This is an equivalent division

12, 24, 36, 48, 60, 72, 84, 96, 108 ← Listing out the 12 times table can help with the division

682

(Total for Question 18 is 3 marks)

.CG Maths.

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

Number on dice	1	2	3	4	5	6
Probability			0.10	0.30	0.05	0.25

Karim assumes that the probabilities that the dice will land on 1 and on 2 are the same.

Karim rolls the biased dice 500 times.

(a) Assuming Karim is right, work out an estimate for the number of times the dice will land on 2

$$0.10$$
$$+ 0.30$$
$$+ 0.05$$
$$+ 0.25$$
$$\overline{0.70}$$

Adding the probabilities for 3, 4, 5, 6 works out that the probability of the dice not landing on 1 or 2 is 0.7

$$1.^10$$
$$- 0.7$$
$$\overline{0.3}$$

It is certain to either land on 1 or 2 or to not land on 1 or 2. So the probabilities need to add up to 1. Subtracting the probability of not landing on 1 or 2 from 1 works out that the probability of landing on 1 or 2 is 0.3

$$500 \times 0.3$$

Multiplying the 500 rolls by the probability of landing on 1 or 2 estimates that the dice will land on 1 or 2 150 times. $5 \times 3 = 15$ so $500 \times 0.3 = 150$

$$\begin{array}{r} 0\ 7\ 5 \\ 2\overline{|1\ ^15\ ^10} \end{array}$$

It is assumed that the probabilities of 1 and 2 are the same. So the number of times it lands on 2 would be half of the time it lands on 1 or 2

...................**75**....................

(3)

Karim is wrong.
The probability that the dice will land on 2 is greater than the probability that the dice will land on 1

(b) How does this information affect your answer to part (a)?

It will be greater

Increasing the probability of 2 should increase the number of times it lands on 2

(1)

(Total for Question 19 is 4 marks)

.CG Maths.

Turn over ▶

20 (a) Work out $3\frac{1}{2} - 1\frac{1}{6}$

Give your answer as a mixed number.

$\frac{7}{2} - \frac{7}{6}$ ← Converted the mixed numbers into improper fractions by multiplying the whole numbers by the denominators then adding the results to the numerators

$\frac{21}{6} - \frac{7}{6}$ ← Multiplying both the numerator and denominator of 7/2 by 3 so that the denominator is 6 and is the same as the denominator of 7/6

$\frac{14}{6}$ ← Subtracting the numerators. The denominator stays the same

Converting into a mixed number by dividing the numerator by the denominator to get the whole number and leaving the remainder in the fraction

$2\frac{2}{6}$

(2)

(b) Show that $5\frac{1}{4} \div 2\frac{1}{3} = 2\frac{1}{4}$ Working with the left side to show that it gives the right side

$\frac{21}{4} \div \frac{7}{3}$ ← Converted the mixed numbers into improper fractions by multiplying the whole numbers by the denominators then adding the results to the numerators

$\frac{21}{4} \times \frac{3}{7}$ ← To divide by a fraction: keep the first part, change the division to a multiplication, flip the fraction

$\frac{3}{4} \times \frac{3}{1}$ ← Simplifying the fractions by dividing both the numerator of the first fraction and the denominator of the second fraction by 7

$\frac{9}{4}$ ← To multiply fractions: multiply the numerators and multiply the denominators

$2\frac{1}{4}$ ← Converting into a mixed number by dividing the numerator by the denominator to get the whole number and leaving the remainder in the fraction

(3)

(Total for Question 20 is 5 marks)

.CG Maths.

21 *ABCD* is a parallelogram.
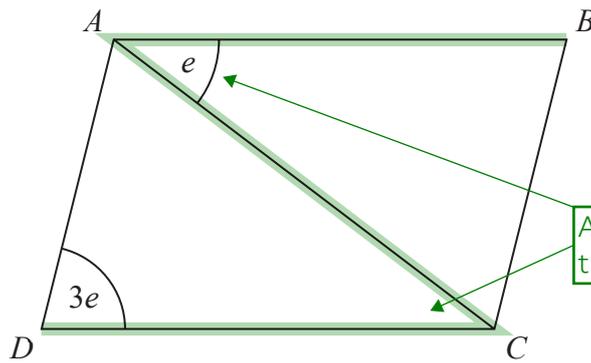
All angles are measured in degrees.

Find an expression, in terms of *e*, for the size of angle *CAD*.
Give a reason for each stage of your working.

Angle ACD = e, as alternate angles are equal ← Angle ACD = angle CAB

3e + e ← Adding angles ADC and ACD works out that there is 4e in the triangle ACD so far

Angle CAD = 180 - 4e, as angles in a triangle add up to 180°

Subtracting the 4e in the triangle so far from the total of 180° leaves angle CAD

180 - 4e

(Total for Question 21 is 3 marks)

22 A car travelled 4.96 miles at an average speed of 30.4 miles per hour.

(a) Work out an estimate for the time taken by the car.
Give your answer in minutes.

$s \frac{d}{}\ t$ ← Writing the formula triangle for distance, speed, time

$\dfrac{5}{30}$ ← Covering t in the formula triangle finds that time = distance/speed. Rounding the 4.96 miles to 5 miles and the 30.4 miles per hour to 30 miles per hour

$\dfrac{1}{6} \times 60$ ← Simplifying the fraction by dividing both the numerator and denominator by 5 works out that the estimated time taken is 1/6 of an hour. There are 60 minutes in an hour so multiplying this by 60 converts it into minutes

1/6 × 60 = 60 ÷ 6 = 10 ⟶ **10** .... minutes

(3)

(b) Is your answer to part (a) an underestimate or an overestimate?
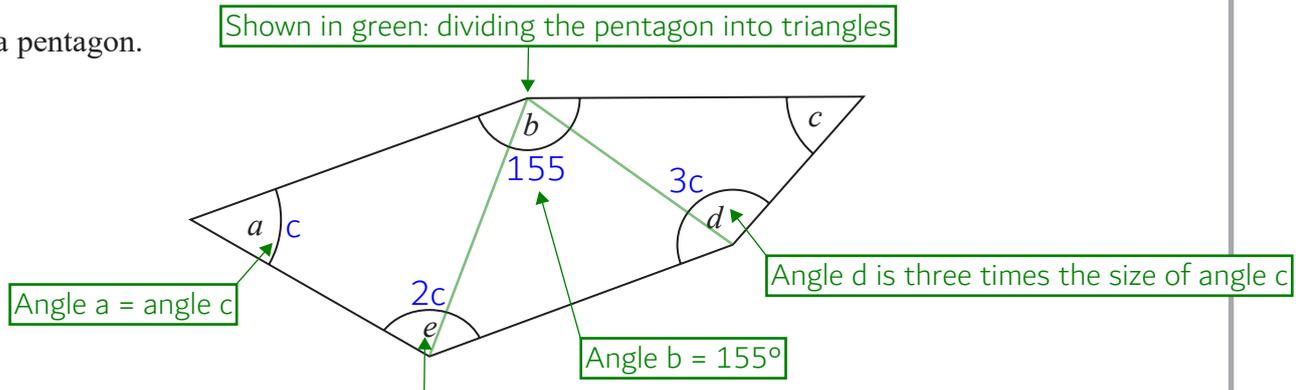Give a reason for your answer.

Overestimate as the distance was rounded up and the speed was rounded down

Dividing a greater number by less will give a
greater value. So the estimated time is too great

(1)

(Total for Question 22 is 4 marks)

.CG Maths.

23 Here is a pentagon.

Shown in green: dividing the pentagon into triangles

b

155

3c

c

a c

d

Angle d is three times the size of angle c

Angle a = angle c

2c

e

Angle b = 155°

Angle e is two times the size of angle c

Angle a = angle c
Angle b = 155°
Angle d is three times the size of angle c
Angle e is two times the size of angle c

Giving all the angles in terms of c

Work out the size of angle a

```
  180
×   3
  540
   2
```

The pentagon can be divided into 3 triangles. Each triangle is 180°.
Multiplying 180° by 3 works out that there are 540° in total in the pentagon

c + 155 + c + 2c + 3c

Expressing the total of the angles in the pentagon in terms of c by adding all the angles in the pentagon

7c + 155 = 540

Simplifying the expression of the total of the angles in the pentagon by collecting like terms. This must be equal to the value of the total 540°

```
  4 13
  5 4 10
- 1 5 5
  3 8 5
```

Subtracting 155 from both sides eliminates the +155 on the left and get the c term on its own. 7c = 385

```
    0 5 5
7 | 3 ³8 ³5
```
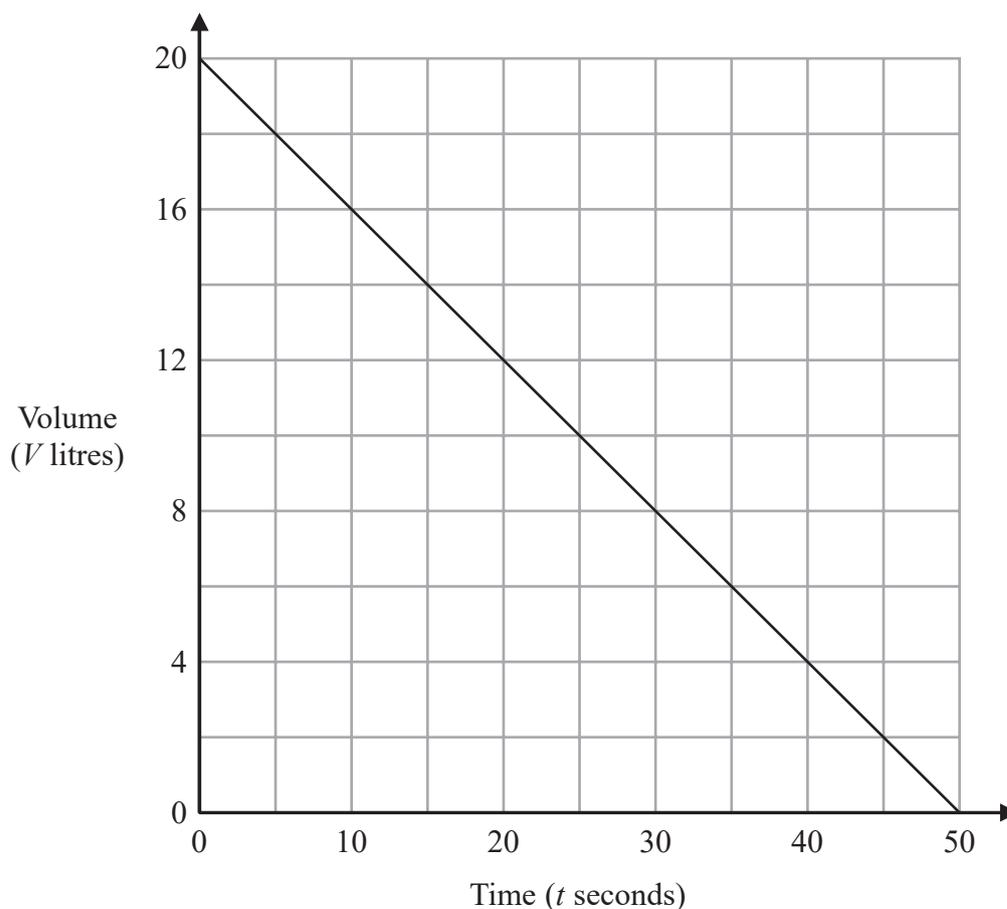
Dividing both sides of 7c = 385 by 7 eliminates the 7 on the left and gets c on its own. So c = 55

Angle a = angle c. So angle a must also be 55° ⟶ 55

......................................°

(Total for Question 23 is 4 marks)

.CG Maths.

Turn over ▶

24 The graph shows the volume of water, V litres, in a tank at time t seconds.

Volume
(V litres)

Time (t seconds)

What does the gradient of this graph represent?

Change in litres of water per second

Gradient = (change in y)/(change in x), so the change in litres is divided by the seconds taken. Per means to divide

(Total for Question 24 is 1 mark)

.CG Maths.

25 Make w the subject of the formula $y = 3w - 10$

$y + 10 = 3w$ ← Adding 10 to both sides eliminates the -10 on the right and gets the w term on its own

Dividing both sides by 3 eliminates the 3 on the left and gets w on its own → $\dfrac{y + 10}{3} = w$

(Total for Question 25 is 2 marks)

26 Solve $x^2 - 2x - 15 = 0$

$(x + 3)(x - 5) = 0$ ← Factorising the left side. Two numbers which add to the -2 and multiply to the -15 are 3 and -5. Putting these in brackets with x

Either x + 3 = 0 (so x = -3) or x - 5 = 0 (so x = 5) → $x = -3$
$x = 5$

(Total for Question 26 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

.CG Maths.