

GCSE Maths: Answers and commentaries

Foundation Tier – Paper 3

A closer look at the live
questions from summer 2022

v1.0



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Help prepare your GCSE students with confidence

Every year in GCSE Maths exams, students often misread, misunderstand or misinterpret questions and don't always do what the question is asking them to do.

This booklet has been designed by our curriculum experts for you to use with your students to explore real responses. Inside you'll find best practice approaches, example responses, examiner commentaries and tips on how to access more marks.

Foundation Tier – Paper 3

Question 5(b)

5 (b) Times for the three parts of a journey are

- 20 minutes
- 40 minutes
- 1 hour 30 minutes.

Work out the **total** time for the journey.

Give your answer in hours.

[2 marks]

Answer _____ hours

Question 5(b), response 1

5 (b) Times for the three parts of a journey are

- 20 minutes
- 40 minutes
- 1 hour 30 minutes.

Work out the **total** time for the journey.

Give your answer in hours.

[2 marks]

$$20 + 40 = 60 \text{ 1hr}$$

$$1\text{hr} + 1\text{hr} 30\text{mins}$$

$$= 2 \text{ hours } 30\text{min}$$

Answer 2.5 hours

Commentary

This student adds together the first two times in minutes and then adds to the third time. They then converts 2 h 30 mins into 2.5 hours (decimal answer).

2 marks

Question 5(b), response 2

5 (b) Times for the three parts of a journey are

- 20 minutes
- 40 minutes
- 1 hour 30 minutes.

Work out the **total** time for the journey.

Give your answer in hours.

[2 marks]

$$20_{\text{m}} + 40_{\text{m}} = 60_{\text{mins}}$$

$$60_{\text{mins}} = 1_{\text{h}}$$

$$1_{\text{h}} + 1_{\text{h}} 30_{\text{m}} = 2_{\text{h}} 30_{\text{mins}}$$

Answer $2 \frac{1}{2}$ hours

Commentary

This student adds together the first two times in minutes and then adds to the third time.

They then convert 2 h 30 mins into $2 \frac{1}{2}$ hours (fraction answer).

2 marks

Question 5(b), response 3

5 (b) Times for the three parts of a journey are

- 20 minutes
- 40 minutes
- 1 hour 30 minutes.

Work out the **total** time for the journey.

Give your answer in hours.

[2 marks]

$$1\text{hr } 30\text{mins} + 20\text{mins} = 1\text{hr } 50\text{mins}$$

$$1\text{hr } 50\text{mins} + 40\text{mins} = 2\text{hr } 30\text{mins}$$

Answer 2hrs 30mins hours

Commentary

Here the student has correctly added together the three times but leaves answer in hours and minutes instead of converting to full hours and part of an hour.

1 mark

Question 5(b), response 4

5 (b) Times for the three parts of a journey are

- 20 minutes
- 40 minutes
- 1 hour 30 minutes.

Work out the **total** time for the journey.

Give your answer in hours.

[2 marks]

$$60 + 30 + 40 + 20 = 150 \text{ min}$$

\swarrow
 2 hrs 30 min

Answer 2 hours hours

Commentary

The student has correctly added together the three times and shown them as 2 h 30 mins. However they then show only the complete number of hours in the answer line.

1 mark

Question 5(b), response 5

5 (b) Times for the three parts of a journey are

- 20 minutes
- 40 minutes
- 1 hour 30 minutes.

Work out the **total** time for the journey.

Give your answer in hours.

[2 marks]

$$\begin{array}{r} 20 + 40 = 60 \\ 1.30 + 30 = 2.00 \\ + 30 = 2.30 \end{array}$$

60 mins
= 1 hour

2 hours, 30 minutes

Answer 2.3 hours

Commentary

The student correctly adds together the three times and show as 2 h 30 mins but then incorrectly converts to number of hours. There is a misconception that time follows the decimal system.

1 mark

Question 5(b), response 6

5 (b) Times for the three parts of a journey are

- 20 minutes
- 40 minutes
- 1 hour 30 minutes.

Work out the **total** time for the journey.

Give your answer in hours.

[2 marks]

$$\begin{array}{r}
 20 \\
 40 \\
 1\ 30 \\
 \hline
 1\ 90
 \end{array}$$

Answer

1

hours

Commentary

In this answer the student shows their method to add the times. They add the minutes to total 90 minutes and then shows this next to 1 hour.

However, they incorrectly give the answer as 1 hour ignoring the 90 minutes.

1 mark

Question 5(b), response 7

5 (b) Times for the three parts of a journey are

- 20 minutes
- 40 minutes
- 1 hour 30 minutes.

Work out the **total** time for the journey.

Give your answer in hours.

[2 marks]

$$\begin{array}{r} 1.30 \\ 20 \\ \hline 40 \\ \hline 1.90 \end{array} \qquad \begin{array}{r} 1.90 \\ \downarrow \\ \text{above } 60 \end{array}$$

Answer _____ 2 _____ hours

Commentary

The student has shown their method to add times. They add minutes to total 90 minutes and then show next to 1 hour.

They incorrectly give the answer as 2 hours, ignoring the additional 30 minutes.

1 mark

Question 6

- 6** Pens cost 20p each.
Rulers cost 60p each.
Saj buys some pens and some rulers.
He buys 8 rulers.
The total cost is £10
How many pens does he buy? **[3 marks]**

Answer _____

Question 6, response 1

- 6 Pens cost 20p each.
Rulers cost 60p each.
Saj buys some pens and some rulers.
He buys 8 rulers.
The total cost is £10
How many pens does he buy?

[3 marks]

$$\begin{array}{r} 60p \times 8 = 4.80 \\ 10 - 4.80 = 5.20 \\ 5.20 \div 20 = 26 \end{array}$$
$$\begin{array}{r} 20 \times 26 = \\ 5.20 \\ + 4.80 \\ \hline 10.00 \end{array}$$

Answer 26

Commentary

Fully correct solution.

3 marks

Question 6, response 2

- 6 Pens cost 20p each.
Rulers cost 60p each.
Saj buys some pens and some rulers.
He buys 8 rulers.
The total cost is £10
How many pens does he buy?

[3 marks]

$$\begin{aligned} \text{pens} &= 20\text{p} \\ \text{Total} &= £10 \\ \text{Rulers} &= 60\text{p} (\$) \\ 60\text{p} (\$) &= £4.80 \\ £10 - £4.80 &= £5.20 \end{aligned}$$

Answer 5**Commentary**

This answer correctly calculates the total of 8 rulers and correctly subtracts £4.80 from £10 to achieve £5.20.

It does not progress to work out the number of pens he buys with £5.20.

2 marks

Question 6, response 3

- 6 Pens cost 20p each.
Rulers cost 60p each.
Saj buys some pens and some rulers.
He buys 8 rulers.
The total cost is £10
How many pens does he buy?

[3 marks]

$$\begin{array}{r} 60p \div 8 = \pounds 7.50 \\ \pounds 20p \div 8 = \pounds 2.50 \\ \hline \pounds 10.00 \end{array}$$

Answer 8

Commentary

This student incorrectly divides 60p by 8 to get £7.50 and then equivalently subtracts £7.50 from £10 for the second independent method mark.

1 mark

Question 6, response 4

- 6 Pens cost 20p each.
Rulers cost 60p each.
Saj buys some pens and some rulers.
He buys 8 rulers.
The total cost is £10
How many pens does he buy?

[3 marks]

$$\begin{array}{l} \text{£10} \quad \text{60p for 8 rulers.} \\ \text{60} \times \text{8} = \text{£4.80} \\ \text{pens 20p} = \text{£5.20.} \quad \text{5 - 1} \\ \quad \quad \quad \quad \quad \quad \quad \quad \times 5 \quad \text{= £25} \end{array}$$

Answer ~~£~~25.**Commentary**

The student correctly calculates the total of 8 rulers and correctly subtracts £4.80 from £10 to achieve £5.20. They then appears to use build up to £5 for 25 pens without dividing.

They may not have used a calculator.

2 marks

Question 8

8

In this question use 1 litre = 1000 millilitres

A mixture is made using white paint and red paint.

$$\text{amount of white paint} = \text{amount of red paint} \div 7$$

5.6 litres of red paint will make **more** than 6 litres of the **mixture**.

How much more?

Give your answer in millilitres.

[4 marks]

Answer _____ ml

Question 8, response 1

- 8 In this question use 1 litre = 1000 millilitres
A mixture is made using white paint and red paint.

$$\text{amount of white paint} = \text{amount of red paint} \div 7$$

5.6 litres of red paint will make **more** than 6 litres of the **mixture**.

How much more?

Give your answer in millilitres.

[4 marks]

$$5.6 \div 7 = 0.8 = 800 \text{ m.l.}$$

$$W_p = 800 \text{ M}$$

$$R_p = 5.6 = 5600 \text{ M}$$

$$5600 - 800 = 4800$$

Commentary

The student correctly works out $5.6 \div 7 = 0.8$ and converts to 800 ml.

They then subtracted 800 from 5600 instead of adding onto 5600 to achieve 6400 ml.

2 marks

Question 8, response 2

8 In this question use ~~1 litre = 1000 millilitres~~

A mixture is made using white paint and red paint.

$$\text{amount of white paint} = \text{amount of red paint} \div 7$$

5.6 litres of red paint will make **more** than 6 litres of the **mixture**.

How much more?

(600ml)

Give your answer in millilitres.

[4 marks]

$$5.6\text{L} \rightarrow 5600 \text{ millilitres}$$

$$\text{red paint} \div 7 = \text{white paint}$$

$$= 5600 \div 7 = 800$$

$$5600 + 800 = 6400$$

$$6400 - 600 = 400 \text{ millilitres}$$

Answer 400 ml

Commentary

Fully correct solution.

4 marks

Question 8, response 3

8 In this question use 1 litre = 1000 millilitres

A mixture is made using white paint and red paint.

$$\text{amount of white paint} = \text{amount of red paint} \div 7$$

5600

5.6 litres of red paint will make **more** than 6 litres of the **mixture**.

How much more?

Give your answer in millilitres.

[4 marks]

$$5.6 \div 1000 = 5600$$

$$5600 \div 7 = 800$$

Answer 800 ml

Commentary

Here the student correctly converts 5.6 litres to 5600 ml and then correctly works out $5600 \div 7 = 800$ ml for the amount of white paint but does not progress further.

2 marks

Question 8, response 4

- 8 In this question use 1 litre = 1000 millilitres
A mixture is made using white paint and red paint.

$$\text{amount of white paint} = \text{amount of red paint} \div 7$$

5.6 litres of red paint will make **more** than 6 litres of the **mixture**.

How much more?

Give your answer in millilitres.

[4 marks]

red $5.6 \text{ litres} = 5600 \text{ millilitres}$ 5.6 L

white $= 5.6 \div 7 = 0.8 \text{ L} \times 1000 = 800 \text{ millilitres.}$ 0.8 L

~~1600 + 800 = 2400~~

$5600 + 800 = 6400$

Answer ~~2400~~ 6400 ml

Commentary

In this answer the student correctly works out $5.6 \div 7 = 0.8$ and converts to 800 ml for the white paint.

They then correctly add the red and white paint together to total 6400 ml but does not work out how much more the total paint is than 6 litres.

2 marks

Question 8, response 5

- 8 In this question use 1 litre = 1000 millilitres
A mixture is made using white paint and red paint.

$$\text{amount of white paint} = \text{amount of red paint} \div 7$$

5.6 litres of red paint will make **more** than 6 litres of the **mixture**.

How much more?

Give your answer in millilitres.

[4 marks]

$$\begin{array}{l}
 \times \\
 5.6 \quad \left(\begin{array}{l} 1 \text{ litre} = 1000 \text{ millilitres} \\ 5.6 = 5600 \text{ millilitres} \end{array} \right) \times 5.6 \\
 \hline \\
 \times \\
 6 \quad \left(\begin{array}{l} 1 \text{ litres} = 1000 \text{ millilitres} \\ 6 \text{ litres} = 6000 \end{array} \right) \times 6 \\
 \hline \\
 5600 \div 7 = 800 \qquad \qquad \qquad 6000 - 800 \\
 \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad = 5200 \\
 \hline \\
 \text{Answer } \underline{5200} \text{ ml}
 \end{array}$$

Commentary

The student has correctly converted 5.6 litres to 5600 ml and then correctly works out $5600 \div 7 = 800$ ml for the amount of white paint.

They correctly convert 6 litres to 6000 ml, but incorrectly subtract 800 from 6000 instead of adding onto 5600 to achieve 6400 ml.

2 marks

Question 8, response 6

- 8 In this question use 1 litre = 1000 millilitres
A mixture is made using white paint and red paint.

$$\text{amount of white paint} = \text{amount of red paint} \div 7$$

5.6 litres of red paint will make **more** than 6 litres of the **mixture**.

How much more?

Give your answer in millilitres.

[4 marks]

1 litre = 1000 millilitres

5.6 Red = 6 + mixture

white = Red \div 7 = $5.6 \div 7 = 0.8$

$0.8 + 5.6 = 6 + \text{mixture}$

= 6.4

= 6 litres, 40 millilitres.

Answer 40 ml

Commentary

In this method the student correctly works out $5.6 \div 7 = 0.8$ and adds to 5.6 to achieve 6.4 litres of paint in total.

They do not correctly convert 6.4 litres to 6400 ml and incorrectly states the answer as 40 ml rather than 400 ml.

2 marks

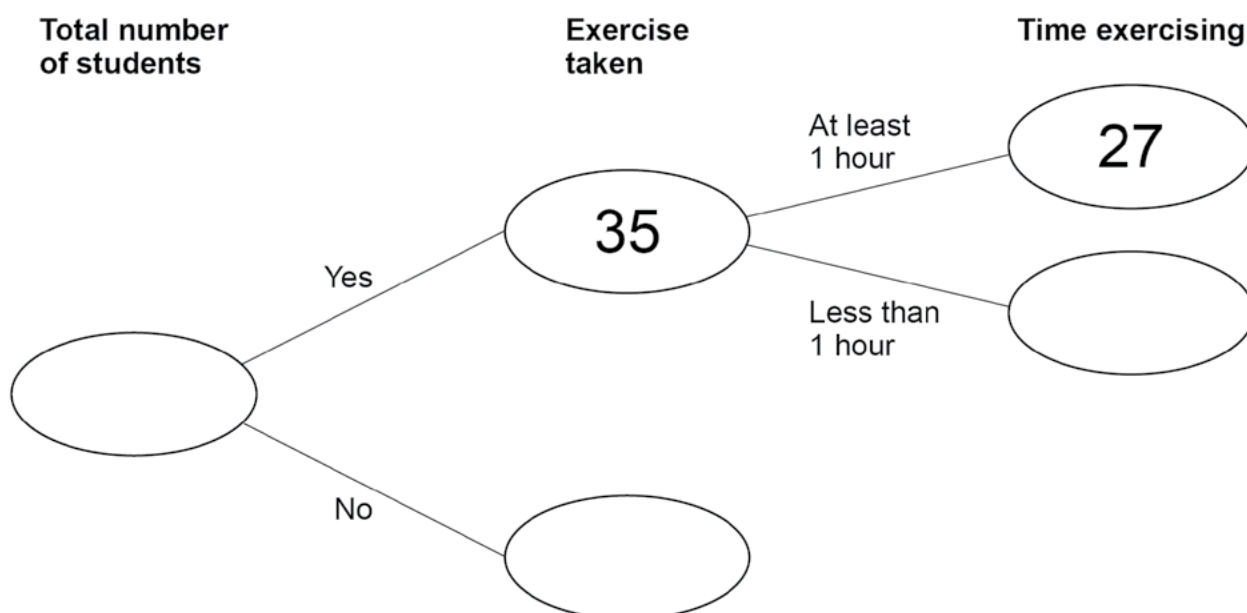
Question 9

9 Some students were asked about their daily exercise.

9 (a) 12 **more** students answered Yes than answered No.

Complete the frequency tree.

[3 marks]



9 (b) One of the 35 students who answered Yes is chosen at random.

What is the probability that they exercise for at least 1 hour?

[1 mark]

Answer _____

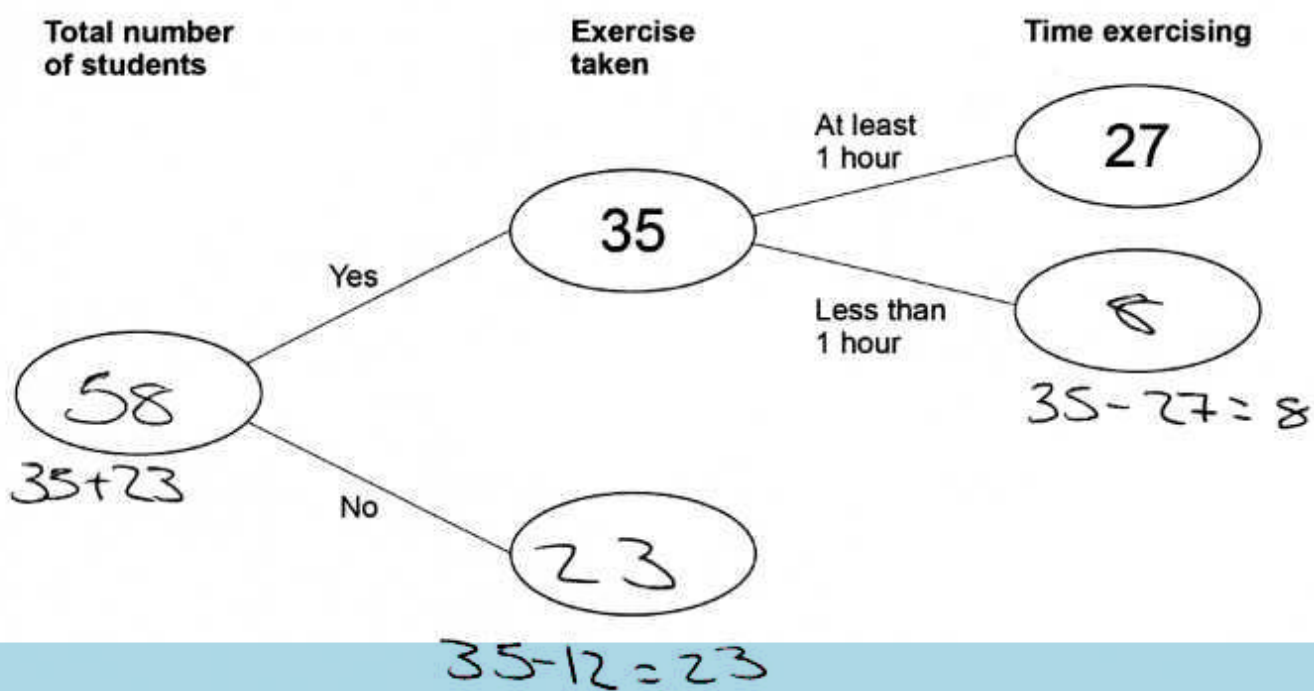
Question 9, response 1

9 Some students were asked about their daily exercise.

9 (a) 12 more students answered Yes than answered No.

Complete the frequency tree.

[3 marks]



Commentary

Fully correct solution.

3 marks

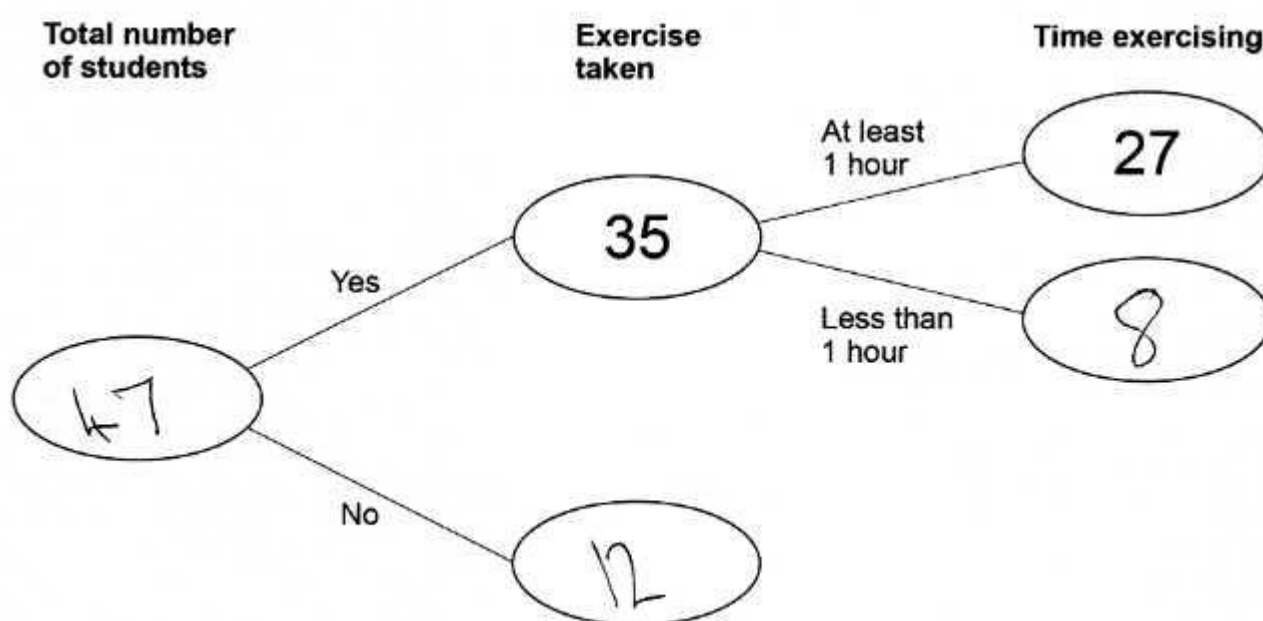
Question 9, response 2

9 Some students were asked about their daily exercise.

9 (a) 12 more students answered Yes than answered No.

Complete the frequency tree.

[3 marks]



Commentary

8 is correct for 'Less than 1 hour Exercising' but the student incorrectly uses 12 from the question (possibly misreads) for 'No exercise taken'. They then correctly follow through to score B1ft for $35 + 12 = 47$.

2 marks

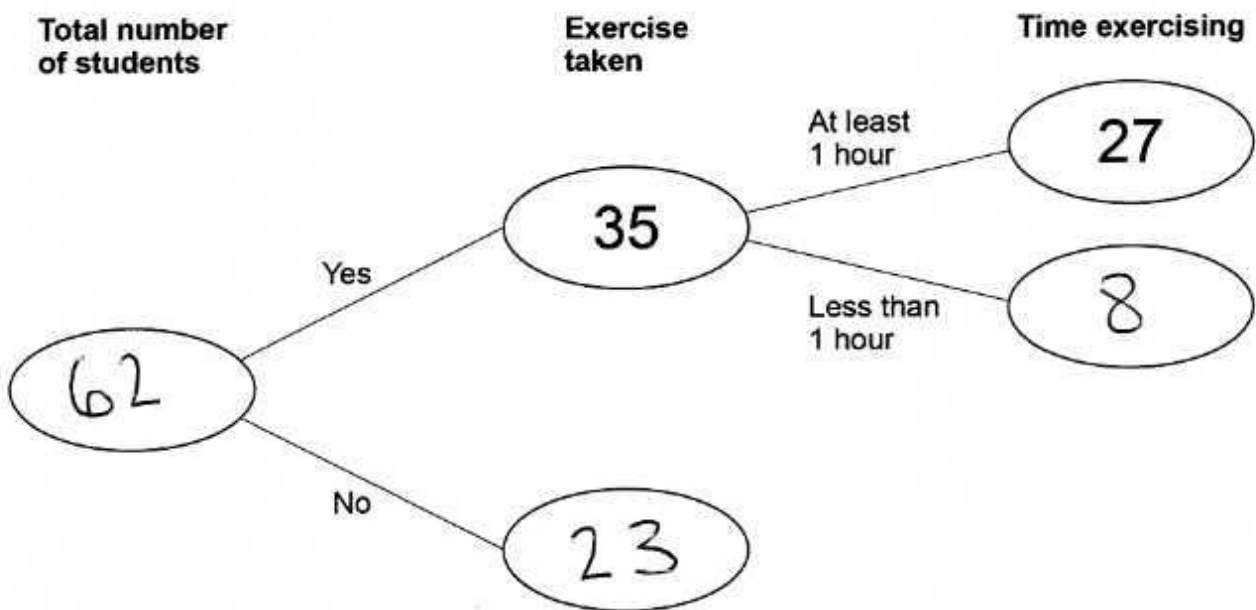
Question 9, response 3

9 Some students were asked about their daily exercise.

9 (a) 12 more students answered Yes than answered No.

Complete the frequency tree.

[3 marks]



Commentary

The student correctly places 8 and 23 in correct ovals for 'Less than 1 hour Exercising' and 'No exercise taken'. They then incorrectly add together $35 + 27 = 62$ for the final mark instead of $35 + 23 = 58$.

2 marks

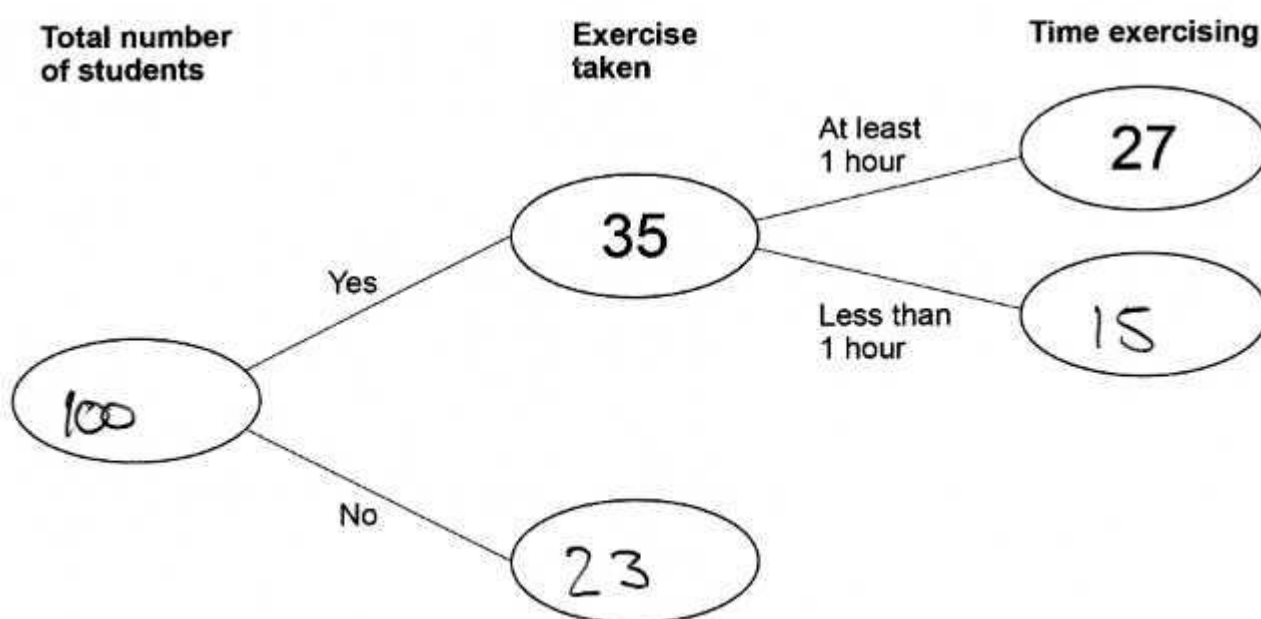
Question 9, response 4

9 Some students were asked about their daily exercise.

9 (a) 12 more students answered Yes than answered No.

Complete the frequency tree.

[3 marks]



Commentary

15 is incorrect for 'Less than 1 hour Exercising' then 23 is correct for 'No exercise taken' with 100 incorrect as 'Total number of students'. Presumably the candidate thought that the total had to be out of 100.

1 mark

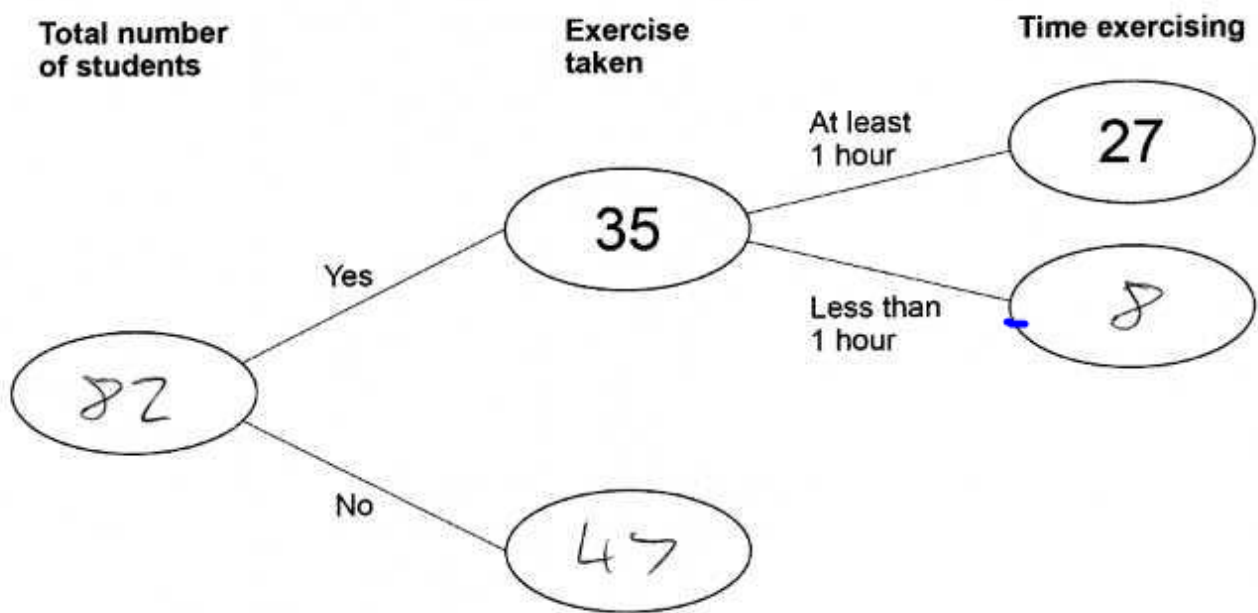
Question 9, response 5

9 Some students were asked about their daily exercise.

9 (a) 12 more students answered Yes than answered No.

Complete the frequency tree.

[3 marks]



Commentary

8 is correct for 'Less than 1 hour Exercising' but the student incorrectly adds 12 onto 35 to give 47 for 'No exercise taken'. They then correctly follows through to score B1ft for $35 + 47 = 82$.

2 marks

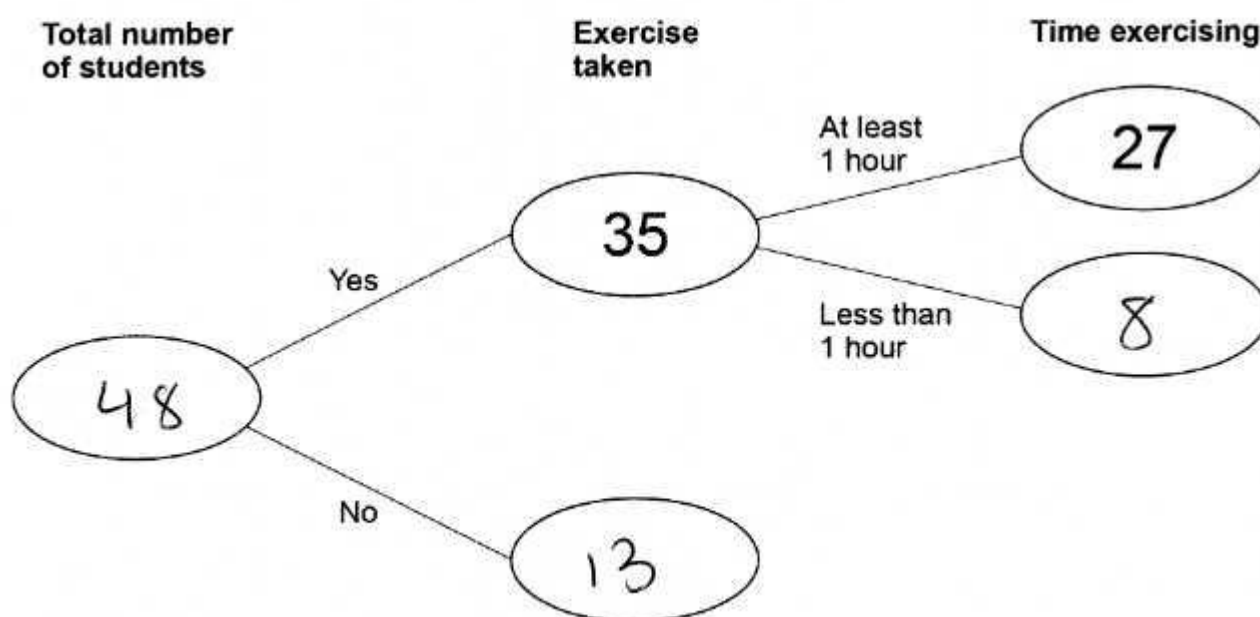
Question 9, response 6

9 Some students were asked about their daily exercise.

9 (a) 12 more students answered Yes than answered No.

Complete the frequency tree.

[3 marks]



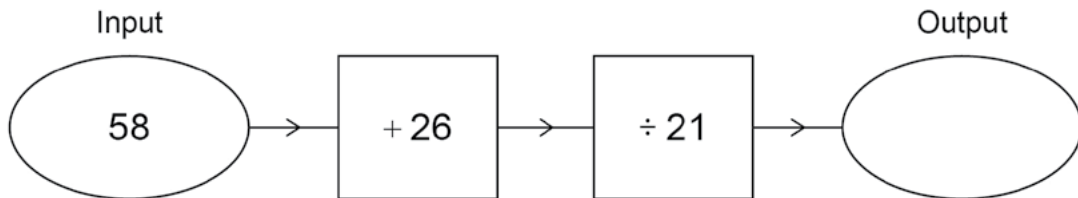
Commentary

8 is correct for 'Less than 1 hour Exercising' but makes an error in subtracting 12 from 35 (probably without using a calculator) to give 13 for 'No exercise taken'. They then correctly follow through to score B1ft for $35 + 13 = 48$.

2 marks

Questions 11(a) and 11(b)

11 (a) Here is a number machine.

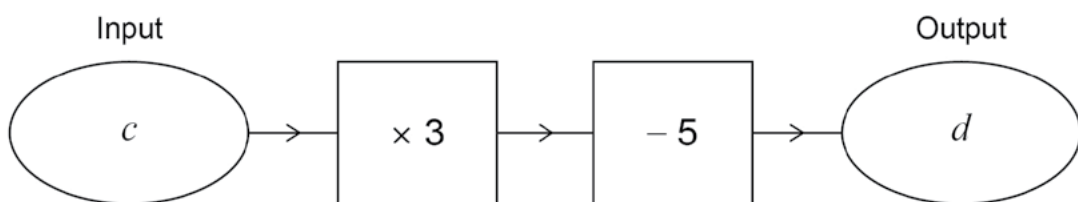


Work out the output.

[1 mark]

Answer _____

11 (b) Here is a different number machine.



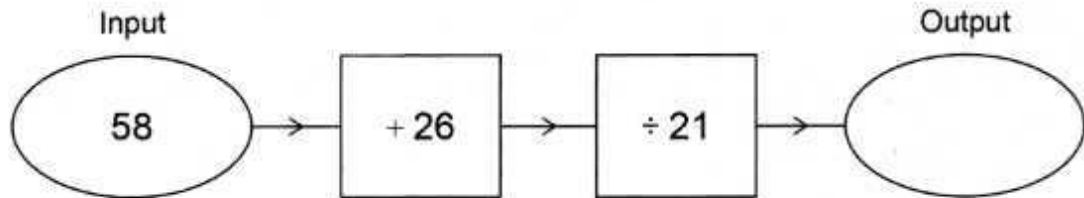
Work out a formula for d in terms of c .

[2 marks]

Answer _____

Question 11(a), response 1

11 (a) Here is a number machine.



Work out the output.

[1 mark]

$$\begin{array}{l} 58 + 26 = 84 \\ 84 \div 21 = 4 \end{array}$$

Answer 4

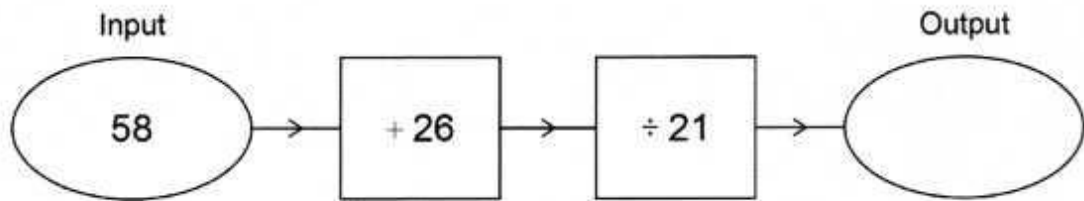
Commentary

Fully correct answer with 4 given on the answer line.

1 mark

Question 11(a), response 2

11 (a) Here is a number machine.



Work out the output.

[1 mark]

$$\begin{array}{l} 58 + 26 = 82 \\ \hline 82 \div 21 = 3.9 \\ \hline \end{array}$$

Answer 3.9

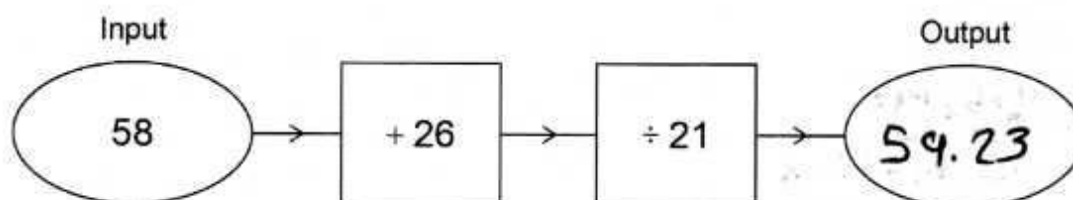
Commentary

The student has made a mistake in the addition of $58 + 26$ (probably without using a calculator) to give 82. The error does not allow a mark as there is an independent mark for a correct answer of 4, even with correct method shown.

0 marks

Question 11(a), response 3

11 (a) Here is a number machine.



Work out the output.

[1 mark]

$$58 + 26 \div 21 = 59.23$$

Answer 59.23

Commentary

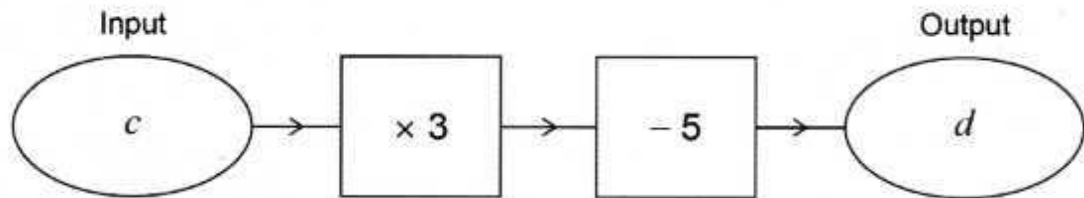
The candidate has used the priority of operations, causing an error where they work out 26 divided by 21 and then added it onto 58.

The rule of the function machine must be used by doing the addition first, either by adding $58 + 26 = 84$ and then dividing by 21 to give correct answer 4, or by correctly using brackets in the calculator $(58 + 26) \div 21 = 4$.

0 marks

Question 11(b), response 1

11 (b) Here is a different number machine.



Work out a formula for d in terms of c .

[2 marks]

Answer $d = c \times 3 - 5$

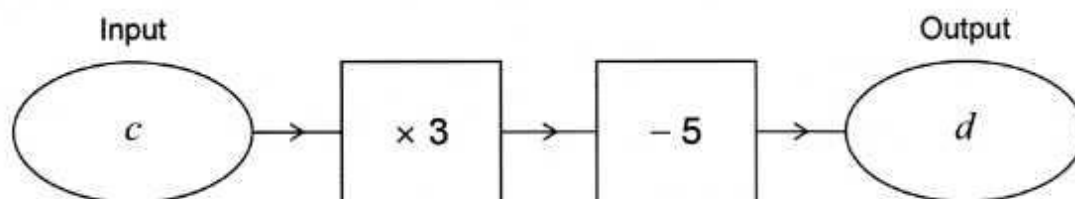
Commentary

This is a correct solution with the use of the multiplication sign $c \times 3$ condoned.

2 marks

Question 11(b), response 2

11 (b) Here is a different number machine.



Work out a formula for d in terms of c .

[2 marks]

$$d = 3c - 5$$

Answer $d = 3c - 5$

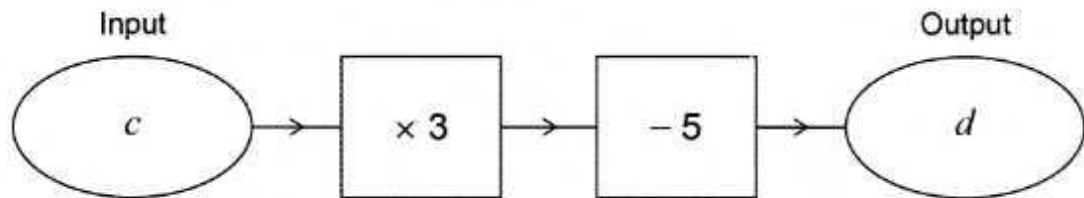
Commentary

Fully correct solution with correct use of algebra without multiplication sign for $3c$.

2 marks

Question 11(b), response 3

11 (b) Here is a different number machine.



Work out a formula for d in terms of c .

[2 marks]

$$(x) - 5$$

Answer $(x) - 5$

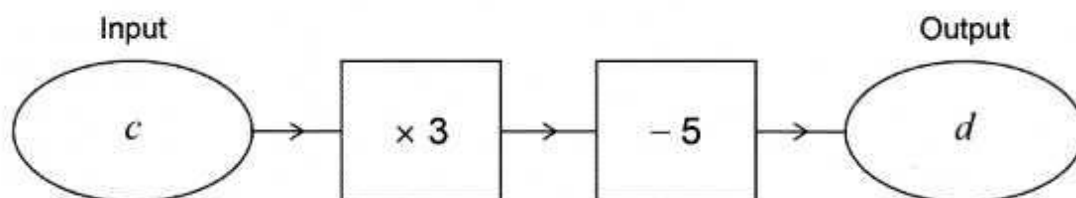
Commentary

No subject stated, the student only shows the correct right hand side of the formula and so loses one mark.

1 mark

Question 11(b), response 4

11 (b) Here is a different number machine.



Work out a formula for d in terms of c .

[2 marks]

$$\begin{array}{l} c \times 3 - 5 = d \qquad c = \frac{d+5}{3} \\ c \times 3 = d + 5 \end{array}$$

Answer ~~$c = \frac{d+5}{3}$~~ $c = \frac{d+5}{3}$

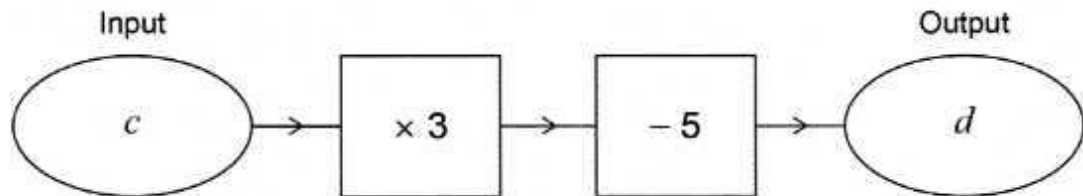
Commentary

The student incorrectly works backwards from right to left showing the inverse function of the correct answer $d = 3c + 5$.

1 mark

Question 11(b), response 5

11 (b) Here is a different number machine.



Work out a formula for d in terms of c .

[2 marks]

$$d = c \times 3 - 5$$

$$c \times 3 = 3c \quad 3c - 5 = -2c$$

Answer $-2c$

Commentary

This student correctly uses the function machine to show the correct answer on the first line but then produces further incorrect work with an attempt to collect like terms incorrectly showing $3c - 5 = -2c$.

1 mark

Questions 12(a) and 12(b)

12 (a) Simplify fully $9x + y - 6x + y$

[2 marks]

Answer _____

12 (b) Here are two expressions.

$$8a$$

$$a^2 - b$$

When $a = 25$ the expressions have the same value.

Work out the value of b .

[3 marks]

$b =$ _____

Question 12(a), response 1

12 (a) Simplify fully $9x + y - 6x + y$

[2 marks]

$$\begin{aligned} 9x - 6x &= 3x \\ 4 + 4 &= 24 \end{aligned} \quad = 3x + 24$$

Answer $3x + 24$.

Commentary

Fully correct solution.

2 marks

Question 12(a), response 2

12 (a) Simplify fully $9x + y - 6x + y$

[2 marks]

Answer $15x - 2y$

Commentary

Incorrect collection of like terms to $15x$ and $-2y$ without working scores no marks.

0 marks

Question 12(a), response 3

12 (a) Simplify fully $9x + y - 6x + y$ [2 marks]

$$9x + 6x = 15x$$

$$y + y = 2y$$

Answer $15x - 2y$

Commentary

Answer $15x - 2y$ with working for $2y$ shown scores B1 for $2y$ correctly collected.

1 mark

Question 12(a), response 4

12 (a) Simplify fully $9x + y - 6x + y$ [2 marks]

$$\begin{array}{r}
 9x + y - 6x + y \\
 +6x \quad \quad \quad +6x \\
 \hline
 15x + y + y \\
 \hline
 15x + 2y
 \end{array}$$

Answer $15x + 2y$

Commentary

Correct collection of $2y$ is B1.

1 mark

Question 12(a), response 5

12 (a) Simplify fully $9x + y - 6x + y$

[2 marks]

$$9x + y - 6x + y = 9x - 6x = 3x$$
$$y + y = y^2$$

Answer $3x + y^2$

Commentary

Correct collection of $3x$ is B1.

1 mark

Question 12(a), response 6

12 (a) Simplify fully $9x + y - 6x + y$

[2 marks]

$$9x - 6x = 3x$$
$$3x - 2y$$

Answer $3x - 2y$

Commentary

A common error was to show $3x - 2y$ which scores B1 for $3x$.

1 mark

Question 12(a), response 7

12 (a) Simplify fully $9x + y - 6x + y$

[2 marks]

$$\begin{array}{l} \cancel{9x} + 9x - 6x \\ y + y = 2y \\ \text{Answer } 3x + 2y \text{ or } 5xy \end{array}$$

CommentaryChoice on answer line means that B1 only is awarded for $3x$ or $2y$.**1 mark**

Question 12(a), response 8

12 (a) Simplify fully $9x + y - 6x + y$

[2 marks]

$$\begin{array}{l} \quad \quad \quad \backslash \quad \backslash \quad / \quad / \\ 9x - 6x = 3x \\ y + y = 2y \quad 3x + 2y = 5xy \\ \text{Answer } 5xy \end{array}$$

CommentaryAnswer of $5xy$ means that B1 only is awarded for $3x$ or $2y$.**1 mark**

Question 12(b), response 1

12 (b) Here are two expressions.

$$8a$$

$$a^2 - b$$

When $a = 25$ the expressions have the same value.

Work out the value of b .

[3 marks]

$$25 \times 8 = 200$$

$$25^2 = 625$$

$$625$$

$$- 200 \quad 425$$

$$b = 425$$

Commentary

Fully correct solution.

3 marks

Question 12(b), response 2

12 (b) Here are two expressions.

$$8a$$

$$a^2 - b$$

When $a = 25$ the expressions have the same value.

Work out the value of b .

[3 marks]

$$8a =$$

$$8 \times 25 = 200$$

$$a^2 - b$$

$$25^2 - b = 625 - b$$

$$200 = 625 - b$$

$$b = 425$$

Commentary

First M1 scored for 200 or 252 or 625

Second M1 scored for $625 - b$

Forming the equation $200 = 625 - b$ would have been the next correct step.

2 marks

Question 12(b), response 3

12 (b) Here are two expressions.

$$8a$$

$$a^2 - b$$

When $a = 25$ the expressions have the same value.

Work out the value of b .

[3 marks]

$$\begin{aligned} 8 \times 5 &= 40 \\ 25^2 - b \\ &= 625 - 585 = 40 \\ b &= 585 \end{aligned}$$

$$b = \underline{585}$$

Commentary

First M1 scored for 252 or 625

Second M1 not awarded as 8×5 is not a correct method to use 40 in the next step.

1 mark

Question 12(b), response 4

12 (b) Here are two expressions.

$$8a$$

$$a^2 - b$$

When $a = 25$ the expressions have the same value.

Work out the value of b .

[3 marks]

$$8a = 33 \qquad a^2 = 50$$

$$4 \qquad a = 25$$

$$50$$

$$33 -$$

$$\underline{17}$$

$$b = \underline{\quad 17 \quad}$$

Commentary

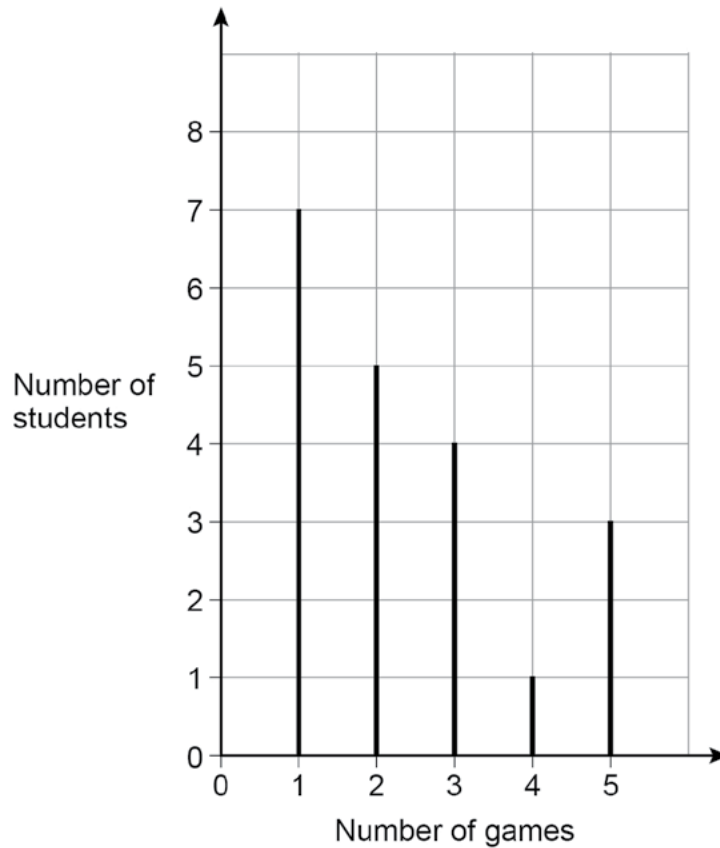
Here there is a misconception that $8a$ means $8 + 25$ together with misconception that $a^2 = 2 \times 25$.

There is no correct working shown and scores zero.

0 marks

Question 14(b)

- 14 20 students are asked how many video games they played last month.
The chart shows information about the results.



- 14 (a) How many students played **more** than 2 games?

[1 mark]

Answer _____

14 (b) Work out the mean number of games played.

Give your answer as a decimal.

[3 marks]

Answer _____

Question 14(b), response 1

- 14 (b) Work out the mean number of games played.
Give your answer as a decimal.

[3 marks]

$$1 \times 7 = 7$$

$$2 \times 5 = 10$$

$$3 \times 4 = 12$$

$$4 \times 1 = 4$$

$$5 \times 3 = 15$$

$$20 \quad 48$$

$$48 \div 20 = 2.4$$

Answer 2.4

Commentary

Fully correct solution.

3 marks

Question 14(b), response 2

14 (b) Work out the mean number of games played.

Give your answer as a decimal.

[3 marks]

$$\begin{array}{r}
 7 \times 1 = 7 \\
 5 \times 2 = 10 \\
 3 \times 4 = 12 \\
 1 \times 4 = 4 \\
 5 \times 3 = 15 \\
 \hline
 48
 \end{array}
 \quad
 \begin{array}{r}
 f \\
 48 \div 5 \\
 = 9.6
 \end{array}$$

Answer

9.6

Commentary

The first M1 scored for five correct products totalled to 48. The student then incorrectly divides by 5 rather than by 20.

1 mark

Question 14(b), response 3

- 14 (b) Work out the mean number of games played.
Give your answer as a decimal.

| | | |
|------------------------------|-------------------|------------------|
| | Student games | [3 marks] |
| $7 \times 1 = 7$ | 7×1 | |
| $2 \times 5 = 10$ | 5×2 | |
| $3 \times 4 = 12$ | 4×3 | |
| $4 \times 1 = 4$ | 1×4 | $48 \div 15$ |
| $5 \times 3 = 15$ | $3 \times 5 = 15$ | $= 3.2$ |
| No-Student no-g <u>48</u> | <u>15</u> | |
| Answer | 3.2 | |

Commentary

The first M1 is scored for five correct products totalled to 48. The student then incorrectly divides by 15 rather than by 20.

1 mark

Question 14(b), response 4

- 14 (b) Work out the mean number of games played.
Give your answer as a decimal. - How?

[3 marks]

$$7 + 5 + 4 + 1 + 3 = 20$$

$$20 \div 5 = 4$$

Answer 4**Commentary**

There is no multiplication of the number of students by the number of games to achieve the correct products. The number of students has been added to an incorrect total of 20 and divided by 5.

0 marks

Question 14(b), response 5

- 14 (b) Work out the mean number of games played.
Give your answer as a decimal.

[3 marks]

~~7/11~~ $1 + 2 + 3 + 4 + 5 = 15$

$15 \div 5 = 3$

~~3/10~~ $3 \div 10 = 0.3$

3.0

Answer 3.0

Commentary

There is no multiplication of the number of students by the number of games to achieve the correct products. The number of games has been added to an incorrect total of 15 and then divided by 5.

0 marks

Questions 15(a) and 15(b)

15 (a) Work out the multiple of 60 that is closest to 400

[2 marks]

Answer _____

15 (b) Work out the highest common factor (HCF) of 12 and 18

[2 marks]

Answer _____

Question 15(a), response 1

15 (a) Work out the multiple of 60 that is closest to 400

[2 marks]

$$60 \times 6 = 360 + \underline{40} = 400$$
$$60 \times 7 = 420 - 400 = 20$$

Answer 420

Commentary

Fully correct solution.

2 marks

Question 15(a), response 2

15 (a) Work out the multiple of 60 that is closest to 400

[2 marks]

x tabs

| | | | | | | |
|----|-----|-----|-----|-----|-----|------|
| 1 | 2 | 3 | 4 | 5 | 6 | over |
| 60 | 120 | 180 | 240 | 300 | 360 | 420 |

Answer 6

Commentary

Multiples of 60 are shown with 360 and 420 both indicated but the answer line does not show the correct answer, 420.

1 mark

Question 15(a), response 3

15 (a) Work out the multiple of 60 that is closest to 400

[2 marks]

$$60 \times 6 = 360$$

Answer $60 \times 6 = 360$ **Commentary**

360 is shown on answer line rather than the correct answer of 420.

1 mark

Question 15(a), response 4

15 (a) Work out the multiple of 60 that is closest to 400

[2 marks]

$$60 \times 6 = 360 \rightarrow +40$$

$$60 \times 7 = 420 \rightarrow -20$$

Answer 7 **Commentary**

420 indicated as the closest multiple but the 7th multiple indicated as the answer with 7 rather than the correct answer of 420.

1 mark

Question 15(a), response 5

Help (-1)

15 (a) Work out the multiple of 60 that is closest to 400

[2 marks]

$$60 \times 2 = 120 \quad 60 \times 6 = 360$$

$$60 \times 3 = 180 \quad 60 \times 7 = 420$$

$$60 \times 4 = 240$$

$$60 \times 5 = 300$$

Answer 60 x 7

Commentary

420 is shown in the working but 60×7 is shown on the answer line, rather than the correct answer of 420.

1 mark

Question 15(b), response 1

15 (b) Work out the highest common factor (HCF) of 12 and 18

[2 marks]

$$\begin{array}{r}
 12 \\
 \hline
 1 \times 12 \\
 3 \times 4 \\
 \textcircled{6} \times 2
 \end{array}
 \qquad
 \begin{array}{r}
 18 \\
 \hline
 1 \times 18 \\
 3 \times \textcircled{6} \\
 2 \times 9
 \end{array}$$

Answer 6**Commentary**

Fully correct solution with the highest common factor selected from a correct list of prime factors of 12 and 18.

2 marks

Question 15(b), response 2

15 (b) Work out the highest common factor (HCF) of 12 and 18

[2 marks]

$$\begin{array}{r}
 12 \\
 \hline
 1 \times 12 \\
 3 \times 4 \\
 \textcircled{6} \times 2
 \end{array}
 \qquad
 \begin{array}{r}
 18 \\
 \hline
 1 \times 18 \\
 3 \times \textcircled{6} \\
 2 \times 9
 \end{array}$$

Answer 6**Commentary**

Fully correct solution with the highest common factor selected from a correct simplification and divisions showing 6 as the highest common factor.

2 marks

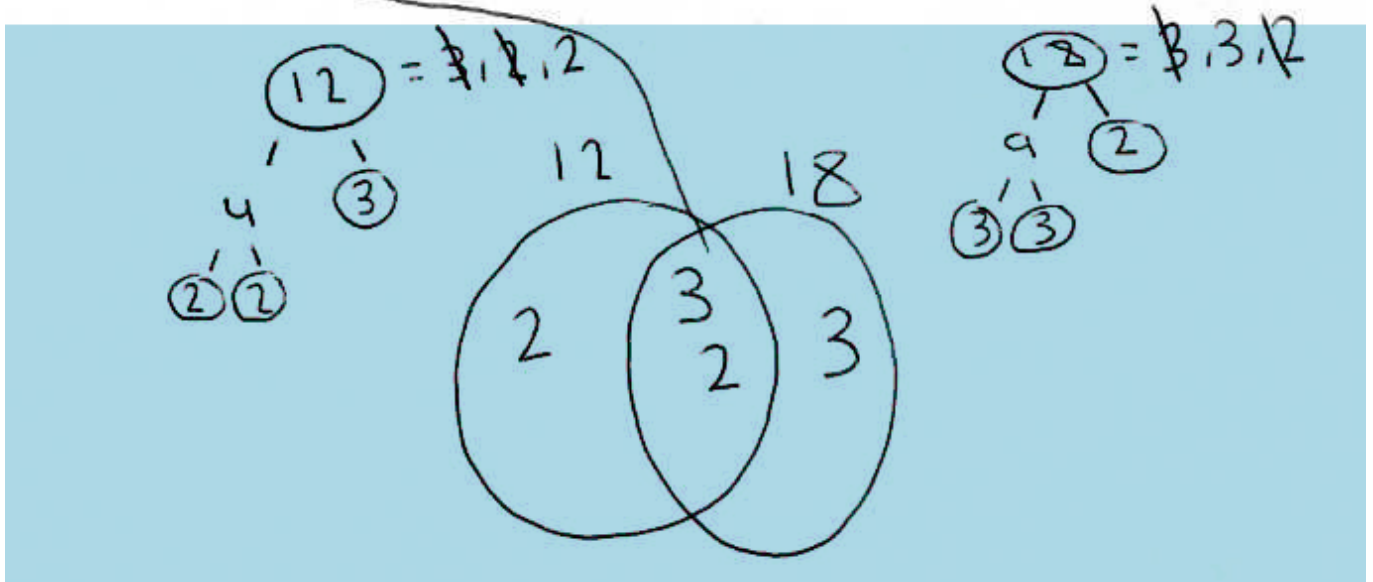
Question 15(b), response 3

15 (b) Work out the highest common factor (HCF) of 12 and 18

[2 marks]

$3 \times 2 = 6$

Answer 6



Commentary

Fully correct solution with the highest common factor calculated from a Venn diagram and prime factor decomposition of 12 and 18.

2 marks

Question 15(b), response 4

15 (b) Work out the highest common factor (HCF) of 12 and 18

[2 marks]

| | | |
|-----|-----|------------|
| 12 | 18 | |
| 24 | 36 | |
| 36 | 54 | |
| 48 | 72 | |
| 60 | 90 | |
| 72 | | Answer 108 |
| 84 | 108 | |
| 96 | | |
| 108 | | |

Commentary

This student has incorrectly shown the multiples of 12 and 18 rather than calculating factors.

2 marks

Question 15(b), response 5

15 (b) Work out the highest common factor (HCF) of 12 and 18

[2 marks]

1, 12, 2, 6, 3, 4
1, 18, 2, 9, 3, 6

Answer

3

Commentary

3 has been selected as a common factor of 12 and 18 from a list of factors of 12 and 18 without recognising that 6 is the highest common factor.

1 mark

Question 16

16 An empty container is a cylinder of radius 3.5 cm and height 40 cm

A tennis ball is a sphere of radius 3.5 cm

Will six of the tennis balls fit in the container?

Tick a box.

Yes

No

Show working to support your answer.

[2 marks]

Question 16, response 1

16 An empty container is a cylinder of radius 3.5 cm and height 40 cm

A tennis ball is a sphere of radius 3.5 cm

Will six of the tennis balls fit in the container?

Tick a box.

Yes

No

Show working to support your answer.

[2 marks]

$3.5 \times 2 = 7\text{cm} \rightarrow \text{height of ball}$

$7 \times 6 = 42$

Commentary

Fully correct solution working out the diameter as 7 cm and then calculating the total height of 6 tennis balls as 42 cm and selecting No.

2 marks

Question 16, response 2

16 An empty container is a cylinder of radius 3.5 cm and height 40 cm

A tennis ball is a sphere of radius 3.5 cm

Will six of the tennis balls fit in the container?

Tick a box.

Yes

No

Show working to support your answer.

[2 marks]

\leftarrow diameter = 7 cm (3.5 + 3.5)
 height = 40 cm
 $40 \div 7 = 5.7$
 $40 \div 6 = 6.6$
 $40 \div 5 = 8$

only 5 will fit into the container

Commentary

Fully correct solution working out the diameter as 7 cm and then dividing the height of the container by 7 to work out that 5.7 tennis balls will fit in the container. The student has ticked No.

2 marks

Question 16, response 3

16 An empty container is a cylinder of radius 3.5 cm and height 40 cm

A tennis ball is a sphere of radius 3.5 cm

Will six of the tennis balls fit in the container?

Tick a box.

Yes No

Show working to support your answer.

[2 marks]

~~$11 \times 3.5^2 \times 40 =$~~

$$\frac{40}{3.5} = 11.4$$

11 can fit in so 6 tennis balls can.

Commentary

The student has made no calculation for the diameter and divides the height of the container by the radius of the tennis balls.

0 marks

Question 16, response 4

16 An empty container is a cylinder of radius 3.5 cm and height 40 cm

A tennis ball is a sphere of radius 3.5 cm

Will six of the tennis balls fit in the container?

Tick a box.

Yes No

Show working to support your answer.

[2 marks]

3.5 x 6 = 21cm height = 40cm

Commentary

This student has made no calculation for the diameter and works out the height of 6 radii of the tennis balls.

0 marks

Question 16, response 5

16 An empty container is a cylinder of radius 3.5 cm and height 40 cm

A tennis ball is a sphere of radius 3.5 cm

Will six of the tennis balls fit in the container?

Tick a box.

Yes

No



Show working to support your answer.



[2 marks]

πr^2

$\pi 3.5^2 = 38.5$

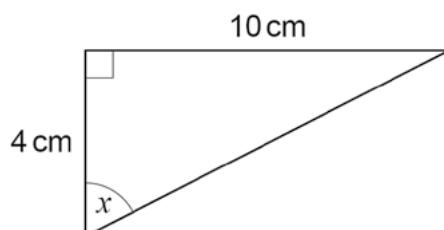
Commentary

Misconception to work out the area of the cross section of a tennis ball.

0 marks

Question 21

- 21 Use trigonometry to work out the size of angle x .



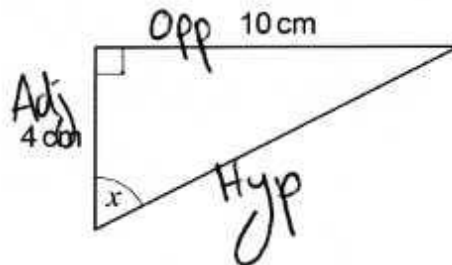
Not drawn accurately

[3 marks]

$x =$ _____ $^{\circ}$

Question 21, response 1

21 Use trigonometry to work out the size of angle x .



Not drawn accurately

[3 marks]

~~S/H~~ ~~C/H~~ ~~A/H~~

$$\tan^{-1}\left(\frac{10}{4}\right) = 68.19859051$$

$$\tan A = \frac{a}{b}$$

$$\tan x = \frac{\text{Opp}}{\text{Adj}}$$

$$x = 68.2^\circ$$

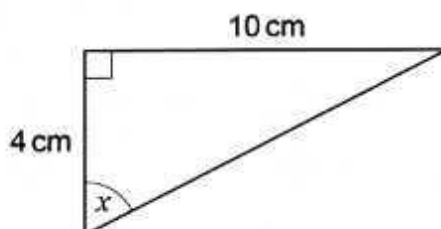
Commentary

Fully correct solution.

3 marks

Question 21, response 2

21 Use trigonometry to work out the size of angle x .



Not drawn accurately

[3 marks]

$$\tan A = \frac{a}{b}$$

~~$$10 \div 4 = 2.5$$~~

$$a^2 + b^2 = c^2$$

$$10^2 + 4^2 = c^2$$

$$c^2 = 116$$

$$x = 116^\circ$$

$$x = 116^\circ$$

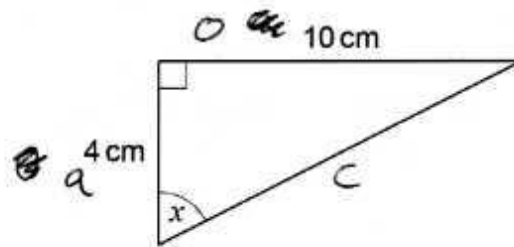
Commentary

Misconception with an attempt to calculate the hypotenuse length.

0 marks

Question 21, response 3

21 Use trigonometry to work out the size of angle x .



Not drawn accurately

[3 marks]

$$\tan x = \frac{4}{10} = 0.4$$

$$\tan^{-1}(0.4) = 21.80140949$$

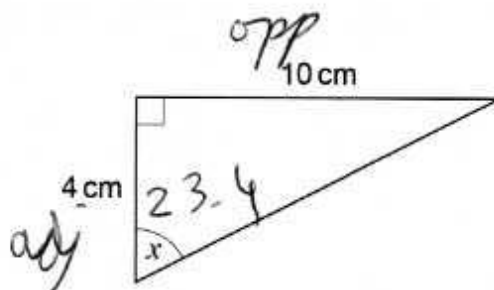
$$x = 21.80140949^\circ$$

Commentary

The first method mark is given for correctly identifying tangent but $\tan x = \frac{4}{10}$ is incorrect.

1 mark

Question 21, response 4

21 Use trigonometry to work out the size of angle x .

Not drawn accurately

[3 marks]

$$\tan = 10 \div 4$$

$$\tan^{-1} 10 \div 4$$

$$x = 23.4^\circ$$

Commentary

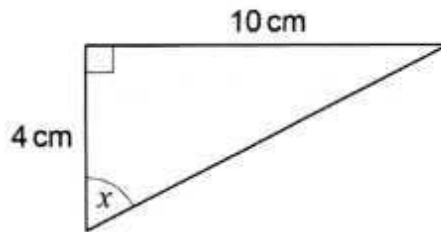
The student gains the first method mark for correctly identifying tangent

$\tan = \frac{10}{4}$ without $\tan x$ is incorrect but $\tan^{-1} \frac{10}{4}$ scores the second method mark with incorrect answer 23.4 shown.

2 marks

Question 21, response 5

21 Use trigonometry to work out the size of angle x .



Not drawn accurately

[3 marks]

Sohcah(Toa)

Opp = 10 cm

$10 \div 4 = 2.5$

Adj = 4

$x = 60^\circ$

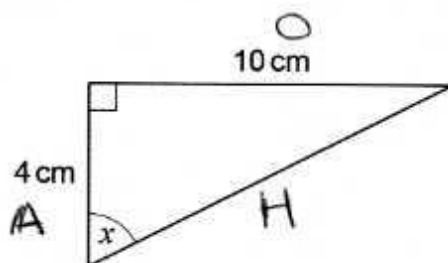
Commentary

The first method mark is awarded for correctly identifying tangent $\frac{10}{4}$ is incorrect for second method mark without $\tan x = \frac{10}{4}$ or $\tan^{-1} \frac{10}{4}$.

1 mark

Question 21, response 6

- 21 Use trigonometry to work out the size of angle x .



Not drawn accurately

[3 marks]

S H C H T A

$\cos x = \frac{10}{4}$

$x =$ _____

Commentary

Misconception in using $\cos x = \frac{10}{4}$ instead of $\tan x = \frac{10}{4}$ scores M0.

0 marks

Question 22

22

Laura works in a shop.

The table shows the number of hours she works on two weekends.

| | Saturday | Sunday |
|-----------|----------------|----------------|
| Weekend 1 | 3 | 2 |
| Weekend 2 | $5\frac{1}{2}$ | $3\frac{1}{2}$ |

Work out the percentage increase in her **total** hours from Weekend 1 to Weekend 2

[3 marks]

Answer _____ %

Question 22, response 1

22 Laura works in a shop.

The table shows the number of hours she works on two weekends.

| | Saturday | Sunday |
|-----------|----------------|----------------|
| Weekend 1 | 3 | 2 |
| Weekend 2 | $5\frac{1}{2}$ | $3\frac{1}{2}$ |

Work out the percentage increase in her **total** hours from Weekend 1 to Weekend 2**[3 marks]**

$$\begin{aligned} (3 + 2 = 5) \quad w1 = 5 \\ (5\frac{1}{2} + 3\frac{1}{2}) = 9 \quad w2 = 9 \end{aligned}$$

$$\begin{array}{l} 5 = 100\% \\ 4 = 80\% \end{array} \quad \begin{array}{l} 180\% = 80\% \\ -100\% \quad \text{increase} \end{array}$$

Answer 80 %**Commentary**

Fully correct solution with method of equating 5 hours to 100%.

3 marks

Question 22, response 2

22

Laura works in a shop.

The table shows the number of hours she works on two weekends.

| | Saturday | Sunday |
|-----------|----------------|----------------|
| Weekend 1 | 3 | 2 |
| Weekend 2 | $5\frac{1}{2}$ | $3\frac{1}{2}$ |

Work out the percentage increase in her **total** hours from Weekend 1 to Weekend 2

[3 marks]

total number of hours for w1 = 5
~~total number of hours for w2 = 9~~

$$5/9 = 0.5$$

$$5 = 9 \times 100 = \text{percentage change}$$

$$5 = 9 - 0.5 \times 100 = 55.5$$

Answer 55.5 %

Commentary

5 and 9 have been identified as the correct increase in hours for W1 and W2 for the first method mark.

An incorrect method has been used to calculate percentage increase, dividing 5 by 9 instead of 9 by 5.

1 mark

Question 22, response 3

22 Laura works in a shop.

The table shows the number of hours she works on two weekends.

| | Saturday | Sunday | |
|-----------|----------------|----------------|---------|
| Weekend 1 | 3 | 2 | = 5 hrs |
| Weekend 2 | $5\frac{1}{2}$ | $3\frac{1}{2}$ | = 9 hrs |

Work out the percentage increase in her **total** hours from Weekend 1 to Weekend 2

[3 marks]

$$5 \times 60 = 300$$

$$9 \times 60 = 540$$

$$540 - 300 = 240$$

$$9 + 5 = 14$$

$$9 - 5 = 4 = 40\%$$

Answer 40 %**Commentary**

5 and 9 have been identified as the correct increase in hours for W1 and W2 for the first method mark.

An incorrect method has been used to calculate percentage increase with 4 hours incorrectly equated to 40%.

1 mark

Question 22, response 4

22

Laura works in a shop.

The table shows the number of hours she works on two weekends.

| | Saturday | Sunday |
|-----------|----------------|----------------|
| Weekend 1 | 3 | 2 |
| Weekend 2 | $5\frac{1}{2}$ | $3\frac{1}{2}$ |

Work out the percentage increase in her **total** hours from Weekend 1 to Weekend 2

[3 marks]

$$5 \text{ hours} = 100\%$$

$$100 \div 5 = 20 \quad 1\% = 3 \text{ mins}$$

$$5\frac{1}{2} + 3\frac{1}{2} = 9 \text{ hours.}$$

$$9 \times 60 = 540$$

$$540 \div 3 = 180$$

Answer 180 %

Commentary

5 and 9 have been identified as the correct increase in hours for W1 and W2 for first method mark.

The correct method has been used to calculate percentage increase, by equating $100\% = 5$ hours (300 mins) and $1\% = 3$ mins, to then correctly show $540 \div 3 = 180\%$ for the second method mark.

The student misses the final step of $180 - 100 = 180\%$.

2 marks

Question 22, response 5

22 Laura works in a shop.

The table shows the number of hours she works on two weekends.

| | Saturday | Sunday |
|-----------|----------------|----------------|
| Weekend 1 | 3 | 2 |
| Weekend 2 | $5\frac{1}{2}$ | $3\frac{1}{2}$ |

5 hrs

9 hrs.

$$\left(\frac{11}{2} + \frac{7}{2}\right)$$

Work out the percentage increase in her **total** hours from Weekend 1 to Weekend 2

[3 marks]

$$\text{Weekend 1} = 5 \text{ hrs.} - 300 \text{ min.}$$

$$\text{Weekend 2} = 9 \text{ hrs} = 540 \text{ min.}$$

$$9 \div 5 = \frac{9}{5} \times 100 = 180\%$$

$$300 \times 1.80$$

~~$$9 \div 4 = \frac{9}{4} \times 100 = 225\%$$~~

Answer

~~180~~

%

Commentary

5 and 9 have been identified as the correct increase in hours for W1 and W2 for the first method mark.

The student has used the correct method to calculate percentage increase, dividing 9 by 5 and multiplying by 100 to show 180%.

This answer is missing the final step of $180 - 100 = 80\%$.

2 marks

Question 22, response 6

22

Laura works in a shop.

The table shows the number of hours she works on two weekends.

| | Saturday | Sunday |
|-----------|----------------|----------------|
| Weekend 1 | 3 | 2 |
| Weekend 2 | $5\frac{1}{2}$ | $3\frac{1}{2}$ |

Work out the percentage increase in her **total** hours from Weekend 1 to Weekend 2

[3 marks]

weekend 1 = 3h sat 2h sun
 weekend 2 = 5h 30mins sat 3h 30 min sun
 $3 \times 60 = 180$ wknd 1 = 300 mins
 $2 \times 60 = 120$ wknd 2 = 540 mins
 $5 \times 60 = 300 + 30 = 330$ $\frac{300}{540} \times 100 = 55\%$
 $3 \times 60 = 180 + 30 = 210$

Answer 55 %

Commentary

300 and 540 have been identified as the correct increase in hours for W1 and W2 for the first method mark.

The student has used an incorrect method to calculate percentage increase, dividing 300 by 540 instead of 540 by 300.

1 mark

Question 24

24

A is an **arithmetic** progression.

Here are the first four terms.

13 16 19 22

G is a **geometric** progression.

Here are the first four terms.

2 4 8 16

n th term of A = 8th term of G

Work out the value of n .

[4 marks]

$n =$ _____

Question 24, response 1

24 A is an **arithmetic** progression.
Here are the first four terms.

$$\begin{array}{cccc}
 13 & & 16 & & 19 & & 22 \\
 & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow \\
 & +3 & +3 & +3 & +3 & +3 & +3
 \end{array}$$

G is a **geometric** progression.
Here are the first four terms.

$$\begin{array}{cccc}
 \frac{1}{2} & & \frac{2}{4} & & \frac{3}{8} & & \frac{4}{16} \\
 & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow \\
 & \times 2 & \times 2 & \times 2 & \times 2 & \times 2 & \times 2
 \end{array}$$

$$\begin{array}{ccc}
 \underline{5} & \underline{6} & \underline{7} \\
 32 & 64 & 128 \\
 \\
 \underline{\underline{8}} \\
 256
 \end{array}$$

n th term of A = 8th term of G

Work out the value of n .

[4 marks]

$$n\text{th term of } A = 3n + 10 =$$

$$3n + 10 = \text{8th term of } G$$

$$16 \times 2 = 32$$

$$32 \times 2 = 64$$

$$64 \times 2 = 128$$

$$128 \times 2 = 256$$

$$3n + 10 = 256$$

$$\begin{array}{r} -10 \\ 3n = 246 \end{array}$$

$$\begin{array}{r} \div 3 \\ n = 82 \end{array}$$

$$n = \underline{\underline{82}}$$

Commentary

Fully correct solution.

4 marks

Question 24, response 2

24 A is an **arithmetic** progression.

Here are the first four terms.

13 16 19 22

G is a **geometric** progression.

Here are the first four terms.

2 4 8 16

n th term of A = 8th term of G

Work out the value of n .

[4 marks]

$$n^{\text{th}} \text{ term of } A = 3n + 10$$

$$8^{\text{th}} \text{ term of } G = 32, 64, 128, 256$$

$$3n + 10 = 256$$

$$n = 256$$

Commentary

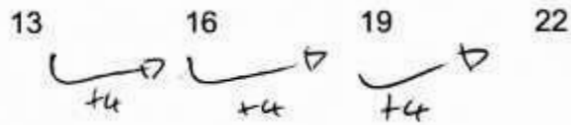
The student correctly identifies $3n + 10$ as n th term for the arithmetic progression and 256 as the 8th term of the geometric progression for the first two method marks.

The third mark is scored for equating $3n + 10 = 256$ but the student does not evaluate the solution.

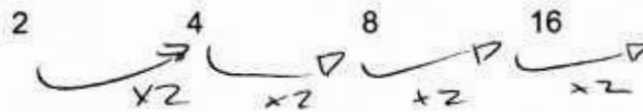
3 marks

Question 24, response 3

24 A is an **arithmetic** progression.
Here are the first four terms.



G is a **geometric** progression.
Here are the first four terms.



| |
|-----------------------------------------------------|
| n th term of A = 8th term of G $4n + 10 = 256$ |
|-----------------------------------------------------|

Work out the value of n .

[4 marks]

~~A + 4~~
 $4n + 10 = 256$
 $16 \times 2 = 32 \times 2 = 64 \times 2 = 128 \times 2 = \cancel{52} 256$

 $n =$ _____

Commentary

The student has correctly identified 256 as the 8th term of the geometric progression for the second method mark.

1 mark

Question 24, response 4

- 24 A is an **arithmetic** progression.
Here are the first four terms.

$$3n + 10$$

$$\begin{array}{cccc} 13 & & 16 & & 19 & & 22 \\ & +3 & & +3 & & +3 & \end{array}$$

- G is a **geometric** progression.
Here are the first four terms.

$$\begin{array}{cccc} 2 & & 4 & & 8 & & 16 \\ & +2 & & +4 & & +8 & \end{array}$$

| |
|----------------------------------|
| n th term of A = 8th term of G |
|----------------------------------|

Work out the value of n .

[4 marks]

$$\underline{\quad 32 \quad 64 \quad 128 \quad 256 \quad}$$

$$n = \underline{\quad 256 \quad}$$

Commentary

The student correctly identifies $3n + 10$ as n th term for the arithmetic progression and 256 as the 8th term of the geometric progression for the first two method marks.

They do not equate $3n + 10 = 256$ for the third method mark..

2 marks

Question 24, response 5

24 A is an **arithmetic** progression.
Here are the first four terms.

13 16 19 22



G is a **geometric** progression.
Here are the first four terms.

2 4 8 16



n th term of A = 8th term of G

Work out the value of n .

[4 marks]

2, 4, 8, 16, 32, 64, 128, 256

8th term of G = 256

$256 - 13 = 243 \div 3 = 81$

A = $13n + 3$ 81

G = $2^n \times 2$

$n =$ ~~256~~ 81

Commentary

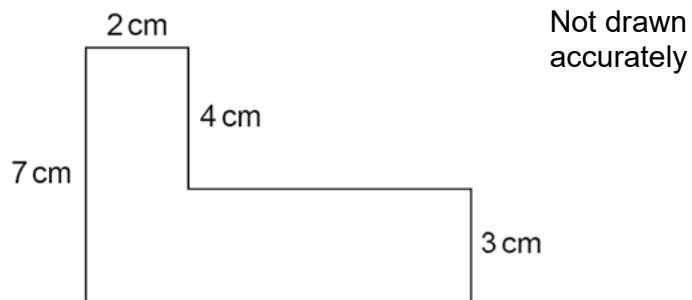
This answer correctly identifies the common difference of 3 for the arithmetic progression and 256 as the 8th term of the geometric progression for the first two method marks.

The third mark is scored for $(256 - 13) \div 3$.

3 marks

Question 25

- 25 The L-shape is made from rectangles.



The area is 44 cm^2

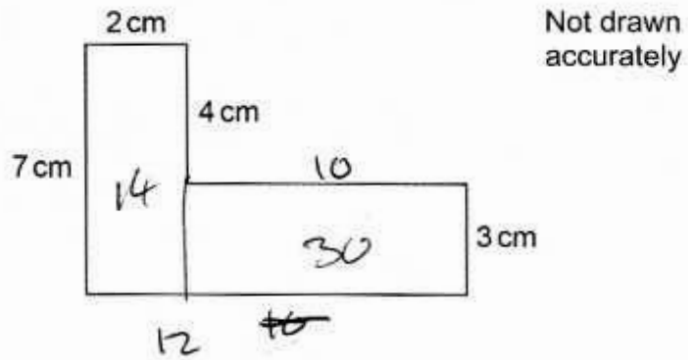
Work out the perimeter.

[3 marks]

Answer _____ cm

Question 25, response 1

25 The L-shape is made from rectangles.



The area is 44 cm^2

Work out the perimeter.

[3 marks]

$$2 + 4 + 7 + 3 + 10 + 12 = 38$$

Answer 38 cm

Commentary

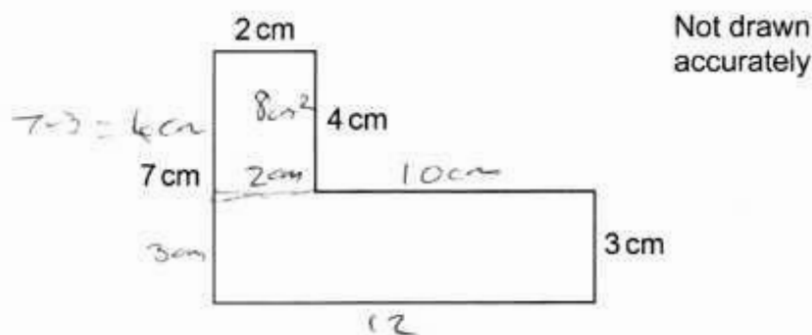
Fully correct solution with areas of 14 and 30 shown on diagram together with correct lengths of 12 and 10.

Correct addition of all lengths shown with correct answer 38 cm indicated.

3 marks

Question 25, response 2

25 The L-shape is made from rectangles.



The area is 44 cm^2

Work out the perimeter.

[3 marks]

$$\text{Area } 2 \times 4 = 8 \text{ cm}^2 = 44 - 8 = 36$$

$$= x \times 3 = 36 = 36 \div 3 = 12$$

$$= \text{base} = 12$$

$$= 12 + 3 + 10 + 4 + 2 + 7 = 38 \text{ cm}$$

Answer 38 cm

Commentary

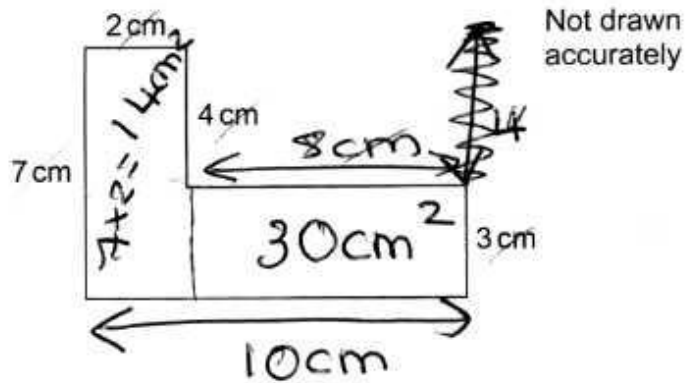
Fully correct solution with areas of 8 and 36 calculated then correct length of 12 calculated from $44 - 8 = 36$ and $36 \div 3$.

Correct addition of all lengths shown with correct answer 38 cm indicated.

3 marks

Question 25, response 3

25 The L-shape is made from rectangles.



The area is 44 cm^2

Work out the perimeter.

[3 marks]

Area : $44 - 14 = 30$ $30 \div 3 = 10 \text{ cm}$

perimeter : $7 + 2 + 4 + 8 + 3 + 10 = 34$

Answer 34 cm

Commentary

The first method mark is given for the correct area 14 shown on diagram.

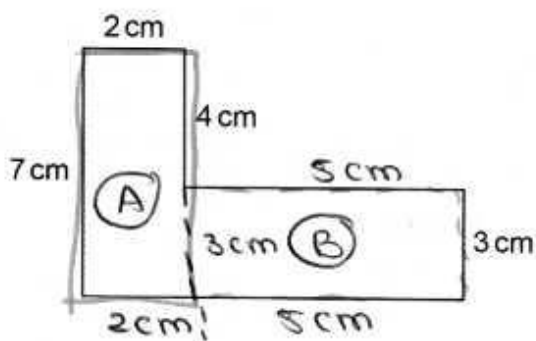
The second method mark is given for the correct calculation of 10 cm calculated from $44 - 14 = 30$ and $30 \div 3$.

Incorrect placement of the 10 cm length on the diagram leads to an incorrect perimeter.

2 marks

Question 25, response 4

- 25 The L-shape is made from rectangles.



The area is 44 cm^2

Work out the perimeter.

[3 marks]

$$\textcircled{A} \quad 7 + 2 + 2 + 7 = 18 \text{ cm}$$

$$\textcircled{B} \quad 3 + 3 + 5 + 5 = 16 \text{ cm}$$

$$\underline{\underline{34 \text{ cm}}}$$

Answer 34 cm

Commentary

No area calculation to correctly calculate missing lengths.

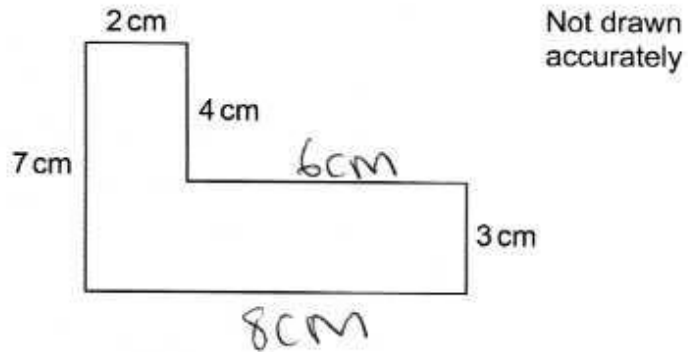
Incorrect length of 5 cm shown on diagram.

Perimeters of two rectangles incorrectly added together for final answer.

0 marks

Question 25, response 5

25 The L-shape is made from rectangles.



The area is 44 cm^2

Work out the perimeter.

[3 marks]

~~4+2+3+2+3~~

$$4 + 2 = 6$$

$$6 + 2 = 8$$

$$7 + 2 + 4 + 6 + 3 + 8 =$$

Answer 30 cm

Commentary

The student has made an incorrect perimeter calculation following incorrect lengths of 6 cm and 8 cm shown on diagram.

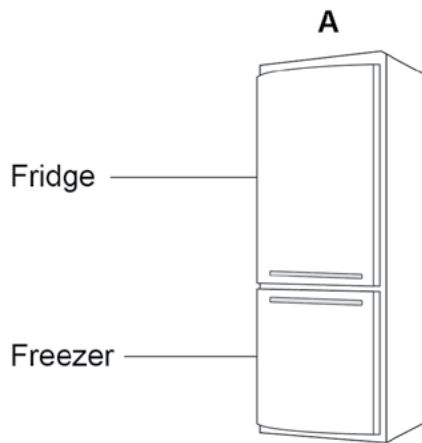
0 marks

Turn over for next question

Question 27

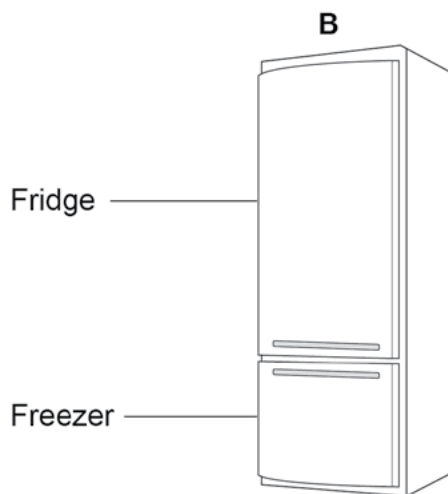
27

Information about two fridge-freezers, A and B, is shown.



Total capacity is 330 litres

fridge capacity : freezer capacity = 3 : 2



Fridge capacity is 294 litres

fridge capacity : freezer capacity = 7 : 3

Grace buys one of these fridge-freezers.
She buys the one with the greater **freezer** capacity.

Which one does she buy?
You **must** show your working.

[4 marks]

Answer _____

Question 27, response 1

Grace buys one of these fridge-freezers.

She buys the one with the greater **freezer** capacity.

Which one does she buy?

You **must** show your working.

[4 marks]

$$3+2=5$$

$$198:132$$

$$330 \div 5 = 66$$

$$66 \times 3 = 198$$

132 greater than

$$66 \times 2 = 132$$

126

$$7+3=10$$

$$294:126$$

$$294 \div 7 = 42$$

$$42 \times 3 = 126$$

Answer A

Commentary

Fully correct solution.

4 marks

Question 27, response 2

Grace buys one of these fridge-freezers.

She buys the one with the greater freezer capacity.

Which one does she buy?

You **must** show your working.

| <u>A</u> | <u>B</u> |
|--------------------------------------------|-----------------------------------------------|
| $3 \times 2 = 6$ | $7 + 3 = 10$ |
| $330 \div 5 = 66$ | $294 \div 10 = 29.4$ |
| $66 \times 3 = 198$ | $29.4 \times 7 = 205.8$ |
| $66 \times 2 = 132$ | $29.4 \times 3 = 88.2$ |
| $3 : 2$ fridge : freezer $198 : 132$ | $7 : 3$ fridge : freezer $205.8 : 88.2$ |

[4 marks]

Answer A

Commentary

First two method marks are awarded for correctly calculating the freezer capacity for A from $330 \div 5 = 66$ and $66 \times 2 = 132$.

The correct calculation would have been $294 \div 7 = 42$ and $42 \times 3 = 126$ for the freezer capacity of B.

2 marks

Question 27, response 3

Grace buys one of these fridge-freezers.

She buys the one with the greater **freezer** capacity.

Which one does she buy?

You **must** show your working.

[4 marks]

| | | |
|-------------------|-------------------|-------------|
| <u>A</u> | | B |
| $330 \div 5 = 66$ | $294 \div 7 = 42$ | $7 : 3$ |
| | $42 \times 3 =$ | $294 : 126$ |
| $3 : 2$ | | |
| $110 : 165$ | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Answer A

Commentary

The first method mark is awarded for $330 \div 5 = 66$ without proceeding to $66 \times 2 = 132$.

The third method mark is given for $294 \div 7 = 42$.

2 marks

Question 27, response 4

Grace buys one of these fridge-freezers.

She buys the one with the greater freezer capacity.

Which one does she buy?

You **must** show your working.

[4 marks]

$$330$$

$$3 : 2$$

$$\frac{2}{5} \times 330 = 132 \text{ liters of FC}$$

$$294$$

$$7 : 3$$

$$\frac{3}{10} \times 294 = 88.2 \text{ liters of FC}$$

Answer

A

Commentary

The student is given the first two method marks for correctly calculating the freezer capacity for A from $\frac{2}{5} \times 330 = 132$.

$\frac{3}{7} \times 294 = 126$ would have been the correct calculation for the freezer capacity of B.

2 marks

Question 28

28

Tom and Adil are the two runners in a 200-metre race.

Tom completes the race in 24 seconds.

Adil completes the race at an average speed of 28.8 kilometres per hour.

Who wins the race?

You **must** show your working.

[3 marks]

Answer _____

Question 28, response 1

28 Tom and Adil are the two runners in a 200-metre race.

Tom completes the race in 24 seconds.

Adil completes the race at an average speed of 28.8 kilometres per hour.

Who wins the race?

You **must** show your working.

$$\begin{array}{l} 28800 \text{ m per hour} \\ \div 60 \\ \div 60 \\ \hline 8 \end{array}$$

[3 marks]

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

~~$$\text{Adil} = 480 \text{ metres per second}$$~~

$$\text{Adil} = 8 \text{ metres per second} \quad \text{Tom} = 24 \text{ secs}$$

$$200 \div 8 = 25 \text{ seconds}$$

Answer Tom

Commentary

Fully correct solution from $\frac{28.8 \times 1000}{60 \times 60} = 8 \text{ m/s}$ for Adil and $200 \div 8 = 25 \text{ secs}$, to show that Adil finished after Tom and selecting Tom as the winner.

3 marks

Question 28, response 2

28 Tom and Adil are the two runners in a 200-metre race.

Tom completes the race in 24 seconds.

Adil completes the race at an average speed of 28.8 kilometres per hour.

Who wins the race?

You **must** show your working.

[3 marks]

$$28.8 \times 1000 = 28800 \quad \frac{28800}{60} = 480 \text{ m/m} = 8 \text{ m/s}$$

$$8 \times 24 = 192 \text{ meters}$$

Answer TOM

Commentary

Fully correct solution from $\frac{28.8 \times 1000}{60 \times 60} = 8 \text{ m/s}$ for Adil and $8 \times 24 = 192 \text{ m}$ to show that Adil finished behind Tom and selecting Tom as the winner.

3 marks

Question 28, response 3

28

Tom and Adil are the two runners in a 200-metre race.

Tom completes the race in 24 seconds.

Adil completes the race at an average speed of 28.8 kilometres per hour.

Who wins the race?

You **must** show your working.

Tom

$$s = 8.$$

$$d = 200 \text{ metres}$$

$$t = 24 \text{ seconds}$$

$$\text{Speed} = d/t.$$

$$200/24 = 8.3$$

~~Adil~~ Adil

$$s = 28.8 \text{ km/h}$$

$$d = 200 \text{ metres}$$

$$t = 28.8 \text{ km/h}$$

$$\text{time} = d/s.$$

$$200^m / 28.8 \text{ km/h} \\ = 6.94$$

Answer _____

Commentary

This student receives the first method mark for $200 \div 24 = 8.3$ m/s or for $200 \div 28.8 = 6.94$.

1 mark

Question 28, response 4

28

Tom and Adil are the two runners in a 200-metre race.

Tom completes the race in 24 seconds.

Adil completes the race at an average speed of 28.8 kilometres per hour.

Who wins the race?

You **must** show your working.

[3 marks]

$$200 \div 24 = 8.3 \text{ m/s} \quad 28.8 \times 1000 = 28800 \text{ m/hour}$$

$$60 \times 60 = \text{seconds in hour} = 3600$$

$$3600 \times 8.3 = 29880 \text{ m/h}$$

$$29880 \text{ m/h} > 28800 \text{ m/h}$$

Answer Tom

Commentary

Here the first method mark is awarded for $200 \div 24 = 8.3 \text{ m/s}$.

The second method mark is given for 3600×8.3 , converting 8.3 m/s into $29\,880$ metres per hour and comparing with 28.8 km/h converted into $28\,800$ metres per hour.

The final accuracy mark is lost by rounding the speed of 8.33 recurring to 8.3 .

2 marks

Question 28, response 5

28 Tom and Adil are the two runners in a 200-metre race.

Tom completes the race in 24 seconds.

Adil completes the race at an average speed of 28.8 kilometres per hour.

Who wins the race?

You **must** show your working.

[3 marks]

$200 \div 24 = 8.34 \text{ mps}$
 $28.8 \text{ km/h} = 28800 \text{ m}$

$\text{mps} = \text{metres per second}$
 $28800 \div 60 = 480 \text{ m}$

$480 \div 60 = 8 \text{ mps}$

$8.34 > 8$

Answer Tom

Commentary

The student is awarded the first method mark for $200 \div 24$ for Tom.

The second method mark is given for $\frac{28.8 \times 1000}{60 \times 60} = 8 \text{ m/s}$ for Adil.

The final accuracy mark is lost by an incorrect value for $200 \div 24$ stated as 8.34 m/s.

2 marks

Question 28, response 6

- 28 Tom and Adil are the two runners in a 200-metre race.
Tom completes the race in 24 seconds.
Adil completes the race at an average speed of 28.8 kilometres per hour.
- Who wins the race?
You **must** show your working.
- [3 marks]**

200 meters in 24 seconds. = TOM

28.8 kilometers per hour.

= 0.48 kilometers per minute.

480 meters per min

$60 \div 24 = 2.5$

$2.5 \times 200 = 500$

Tom does 500m per

min. Adil only does

480 meters per min.

Answer TOM

Commentary

Fully correct solution with a correct calculated comparison of how far Tom (500 m) and Adil (480 m) would have run in a minute.

3 marks

Question 28, response 7

28 Tom and Adil are the two runners in a 200-metre race.

Tom completes the race in 24 seconds.

Adil completes the race at an average speed of 28.8 kilometres per hour.

Who wins the race?

You **must** show your working.

[3 marks]

$$T = 24 \text{ seconds } \frac{200}{24} = 8.3 \text{ m Per second } \frac{480}{200} = 2.4$$

$$A = 28.8 \text{ km } \frac{1}{\text{hr}} \text{ for } 200 \text{ m} \quad 480 \text{ m} = 60 \text{ seconds}$$

$$\frac{1000}{1000} \text{ km } 1000 \text{ m} = 1 \text{ km} \quad 20 \text{ seconds}$$

$$\frac{200}{1000} = 0.2 \text{ km}$$

$$\text{Average Speed} = 28.8 \text{ km Per hour}$$

$$\frac{0.48}{0.2} = 2.4 \quad \div 60 \downarrow 0.48 \text{ (km) Per minute}$$

$$0.48 \times 1000 = 480 \text{ m Per minute}$$

Answer Adil

Commentary

The first method mark is awarded for $200 \div 24 = 8.3 \text{ m/s}$.

The second method mark is not awarded for calculating a distance of 480 m in 60 s for Adil without a correct distance calculated for Tom in 60 s to compare with the 480 m for Adil.

1 mark

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