![MEI Mathematics Education Innovation logo]

Foundations of Advanced Mathematics
# **AS Pure Mathematics Bridging Test 3**

Questions

1   John records the distance that he runs as 20 kilometres, correct to the nearest kilometre. He also notes that the run has taken him 100 minutes, correct to the nearest minute.

Which **one** of the following is the **correct** value John's least possible average speed?

A   11.64 km h^{-1}, correct to 2 decimal places.

B   11.29 km h^{-1}, correct to 2 decimal places.

C   12.36 km h^{-1}, correct to 2 decimal places.

D   12 km h^{-1} exactly.

2   Andy set off at 1200 one day on a bicycle from Portville to Queentown, a distance of 60 kilometres. While riding he travelled at a speed of 15 kilometres per hour, but stopped for an hour on the way.   The distance-time graph below shows this journey.

At 1500, Bob set off from Queentown to Portville, riding at a speed of 20 kilometres per hour.
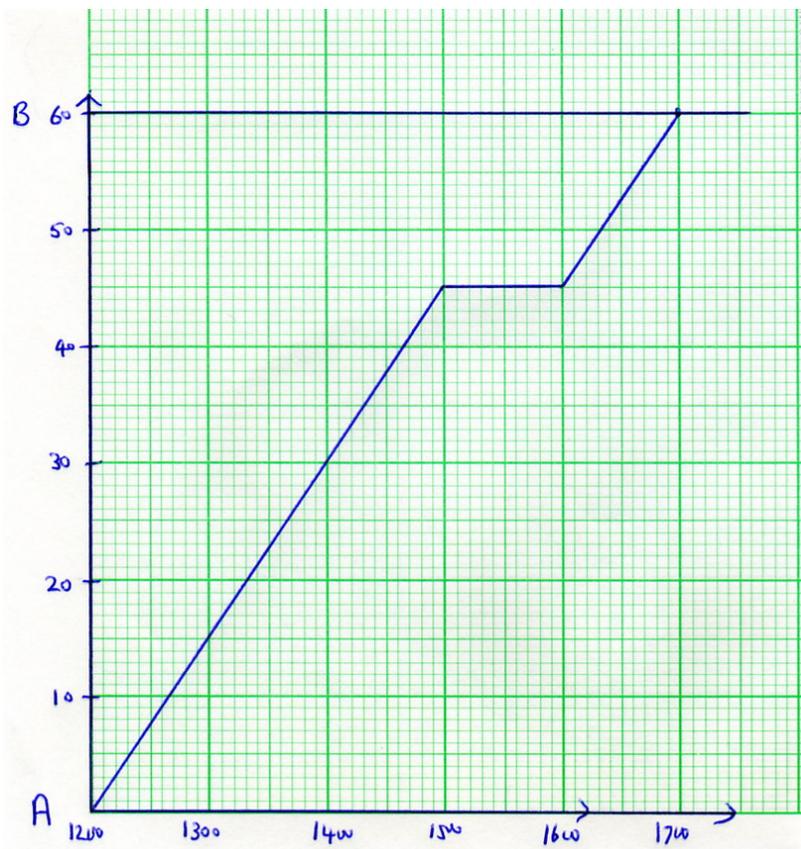
To answer this question you need to draw a line on the graph to represent Bob's journey.

Which **one** of the following statements is **true**?

A   Andy and Bob pass each other at 1345.

B   Andy and Bob pass each other at 1445.

C   Andy and Bob pass each other at 1545.

D   Andy and Bob do not pass each other.

3   In a group of students, twenty are male and thirty are female.
Three tenths of the students are aged 20 years or less and one fifth are over 40 years old.

Three of the following statements are true and **one** is false. Which one is **false**?

A   The ratio, the number of males: the number of females = 2:3.

B   35 students are aged over 20.

C   The number of males in the group is 0.4 × (the total number in the group).

D   60% of students are aged over 20 but not over 40.

4   You are given that $a = 2\dfrac{2}{3}$ and $b = \dfrac{1}{4}$.

Three of the following statements are true and **one** is false. Which one is **false**?

A $a + b = 2\dfrac{11}{12}$

B $a - b = 2\dfrac{5}{12}$

C $a \times b = \dfrac{2}{3}$

D $a \div b = \dfrac{3}{2}$

5   Which **one** of the following is the **correct** simplification of $2(x + 3) - 3(5 - 2x)$?
A $-4x - 9$

B $8x - 9$

C $8x - 12$

D $4x - 12$

6   John is using the formula $t = \dfrac{2s}{u+v}$.

He is given the values $s = 59.6$, $u = 2.3$ and $v = 7.7$. He does not know the accuracy of these values.

Three of the following statements are true and **one** is false. Which one is **false**?

A   If the values are exact, $t = 11.92$.

B   If the values have been rounded to 1 decimal place, the smallest possible value of t is 12.0, correct to 1 decimal place.

C   If John rounds the values to the nearest integer, then his value for t is 12.

D   A rearrangement of the formula is $v = \dfrac{2s - ut}{t}$.

7   Which **one** of the following is a **correct** simplification of $\dfrac{1-x}{3} - \dfrac{2(x-3)}{5}$?

A $\dfrac{4-3x}{2}$

B $\dfrac{23-11x}{15}$

C $\dfrac{x-13}{15}$

D $\dfrac{x+23}{15}$

8   Three of the following statements are true and **one** is false. Which one is **false**?

A $\left(3xy^2\right)^3 = 27x^3y^6$

B $\left(3xy^2\right) \times 3 = 27xy^2$

C $\dfrac{x^5 \times x^3}{x^4} = x^4$

D $2(x-1) - 3(2-x) = 5x - 8$

9   Three of the following statements are true and **one** is false. Which one is **false**?

   A $x = 3$ is the solution of the equation $2(x + 1) = 8$.

   B $x = -4$ is the solution of the equation $3x - 12 = 0$.

   C $x = -3$ is one of the roots of the equation $x^2 - 9 = 0$.

   D   The two roots of the equation $x^2 = 8x$ are $x = 0$ and $x = 8$.

10   Emma is attempting to solve this pair of simultaneous equations.

$$3x + 2y = 9 \quad \text{(i)}$$
$$4x - y = 1 \quad \text{(ii)}$$

   Her working is shown in the four steps below, but her final answer is incorrect.

   In **which** of the following steps **A**, **B**, **C** or **D** does her **first** error occur?

   A   Multiply (ii) by 2: $8x - 2y = 2$ (iii)

   B   Add (iii) and (i): $11x = 11$ (iv)

   C   Divide both sides of (iv) by 11: $x = 1$

   D   Substitute this value of x into (ii): $4 - y = 1$ gives $y = 5$