**HIGHER TIER**
**MINI PRACTICE EXAM 10**

**CALCULATOR ALLOWED**
**20 MINUTES ALLOWED**

metatutor

1.
Shaun is going to run 5 kilometres on his treadmill.
He is going to run at 10 kilometres per hour for the first 4,500 metres, and at 12 kilometres per hour for the final 500 metres.
Shaun's personal best time is currently 29 minutes 35 seconds.

Will Shaun beat his personal best?

4.5 ÷ 10 = 0.45 hours × 60 = 27 minutes
0.5 ÷ 12 = 1/24 hours × 60 = 2.5 minutes

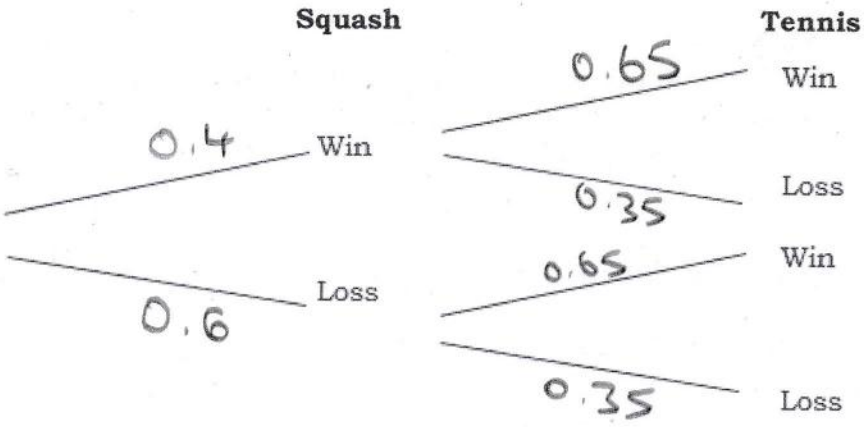
27 minutes + 2.5 minutes = 29 minutes 30 seconds

Shaun will beat his personal best.

(3)

2.
Tom is going to play his friend at squash and tennis.
The probability of Tom winning at squash is 0.4.
The probability of Tom winning both games is 0.26.

(a) Complete the probability tree below.




0.26 ÷ 0.4 = 0.65 = probability of winning tennis

(3)

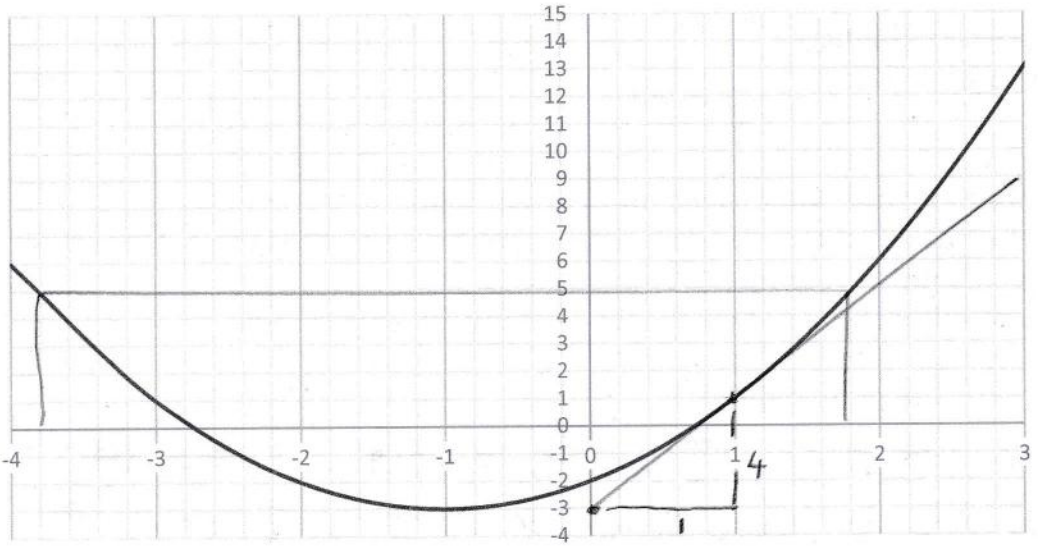
(b) Work out the probability that Tom wins at least one of the two games.

P(2 losses) = 0.6 × 0.35 = 0.21

1 − 0.21 = 0.79

(2)

4.
Pictured below is the graph y = f(x + 2).




(a) Use the graph to estimate the solutions to the equation f(x) = 0.

−0.8 and 2.8

(2)

(b) Use the graph to estimate the solutions to the equation f(x + 2) ~~= 5.~~ −5 = 0

−3.8 and 1.8

(2)

(c) Use the graph to estimate the gradient of the curve at x = 1.

$$\text{gradient} = \frac{\text{change in } y}{\text{change in } x} = \frac{4}{1} = 4$$

(2)

5.
Chris is hosting a party.
He has two mathematically similar cups – small and large.
The small cups have a capacity of 320 millilitres and are 12 centimetres tall.
The large cups are 20 centimetres tall.
Chris made 35 litres of fruit punch.

How many large cups can Chris fill with fruit punch?

$$\text{Scale factor} = \frac{20}{12} = 1\frac{2}{3}$$

$$\text{Volume scale factor} = \left(1\tfrac{2}{3}\right)^3 = 4\tfrac{17}{27}$$

$$\text{Capacity of large cup} = 320 \times 4\tfrac{17}{27} = 1{,}481.481 \text{ ml}$$

$$35{,}000 \div 1{,}481.481 = 23.625 \text{ cups}$$

(5)

23 large cups