

# Marked candidate answers

## Level 3 Mathematical Studies

### Introduction

This document shows a selection of different candidate answers from paper 1 of our specimen assessment material. Each answer below received full marks.

Pete wants to buy a house.

His annual salary is £60 000 .

The bank will lend him 3 times his annual salary for a mortgage.

This is 90% of the house price.

What is the price of the house?

[3 marks]

$$\begin{array}{l}
 \text{60,000} \times 3 = \text{180,000} \quad \text{90\%} \\
 \text{90\%} \rightarrow \text{180,000} \\
 \text{100\%} \rightarrow \text{200,000} \\
 \text{100} \div \text{90} = \frac{10}{9} \times \text{180,000} \\
 = \text{200,000}
 \end{array}$$

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[3 marks]

$$\begin{array}{l}
 \text{60 000} \times 3 = \text{180 000} \\
 \frac{180\,000}{90} \times 100 = \text{200 000} \\
 \text{£200 000}
 \end{array}$$

Estimate the number of heartbeats an adult human has in one year.

Show details of your assumptions and calculations.

[5 marks]

72 beats per minute B1

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1 year = 365 days = 60s x 60 = 3600s in an hour

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$3600 \times 24 = 86400 \text{ s/day} \times 365 = 3153600 \text{ s}$

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$3153600 \times \frac{72}{60} = \text{M1}$   
 $\text{M1/A1}$

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$72 \times 525600 = 37843200 \text{ beats a year}$  A1

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Estimate the number of heartbeats an adult human has in one year.

Show details of your assumptions and calculations.

[5 marks]

3

~~scribble~~

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Number of heartbeats per minute: 100 B1

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heartbeats per hour =  $100 \times 60 = 60,000$

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beats per day =  $60,000 \times 24 = 1,440,000$

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Beats per year =  $1,440,000 \times 365 \text{ days} = 525,600,000$

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Heartbeats per year = 525,600,000 M1  
 M1/A1  
 A1

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Sam invests £1000 in a savings account.

The compound interest rate is 4% each year.

How many years will it take for the value of his investment to double?

[3 marks]

$$1000 \times 1.04^{18} = 2025.82$$

It will take Sam roughly  
18 years for his investment to  
double.

Sam invests £1000 in a savings account.

The compound interest rate is 4% each year.

How many years will it take for the value of his investment to double?

[3 marks]

$$1000 \times 1.04 = 1040$$

$$1000 \times 1.04^2 = 1081.6$$

$$1000 \times 1.04^3 = 1124.86$$

$$1000 \times 1.04^5 = 1216.65$$

$$1000 \times 1.04^{13} = 1665.67$$

$$1000 \times 1.04^{18} = 2025.82$$

18 year? /

Estimate how far a human being is likely to walk in their lifetime.  
Show details of your assumptions and calculations.

[6 marks]

70 years: ~~2000~~ <sup>61</sup> meters ~~per~~ 2 miles a day.  
 $2 \times 30 = 60$  miles a month.  
 $60 \times 12 = 720$  miles a year. <sup>11</sup>  
 $720 \text{ miles} \times 70^{\text{yrs}}$  = 50400 miles  
 in a average lifetime. <sup>11</sup> <sub>A1</sub>

Estimate how far a human being is likely to walk in their lifetime.  
Show details of your assumptions and calculations.

1000 = 1000

[6 marks]

$\frac{8,000 \text{ steps/day}}{3}$  <sup>1 step = 3 steps = 1 meter</sup>  
 $\frac{2666.6 \text{ meter}}{3} = 2667 \text{ /day}$

Age 15-45 = 2667 /day  
 1-3 =  $\frac{500 \text{ steps}}{3} = 166.6 = 167 \text{ /day}$   
 4-6 =  $\frac{800 \text{ steps}}{3} = 266.6 = 267 \text{ /day}$   
 46-45 =  $\frac{4000 \text{ steps}}{3} = 1333.3 = 1333 \text{ m/day}$   
 7-14 =  $\frac{5000}{3} = 1666.6 = 1667 \text{ /day}$

$365 \times 2 = 730$   
 $167 \times 2 = 334 \text{ m in 2 yr}$   
 $267 \times 2 = 534 \text{ m in 2 yr}$   
 $1667 \times 7 = 11669 \text{ m in 7 yr}$   
 $2667 \times 10950 = 29263650 \text{ m in 30 yr}$   
 $1333 \times 84235 = 18978255 \text{ m in 30 yr}$   
 $52241905 \text{ m}$