

For Edexcel

GCSE Mathematics

Paper 3A (Non-Calculator)

Higher Tier



Marking Guide

Method marks (M) are awarded for knowing and using a correct method.

Accuracy marks (A) are awarded for correct answers, having used a correct method.

(B) marks are independent of method marks.



Written by Shaun Armstrong

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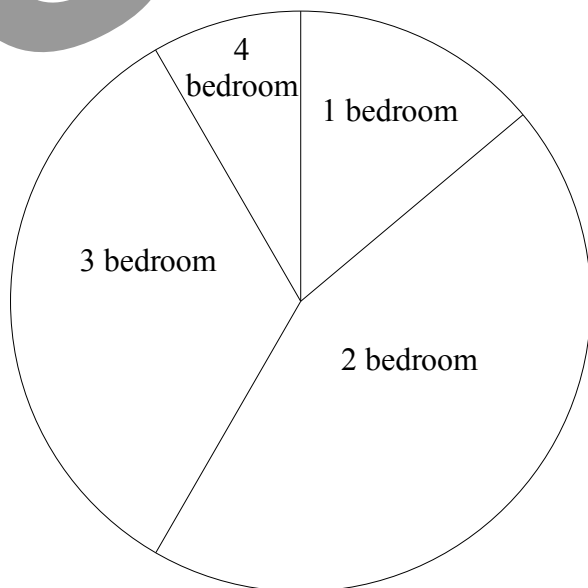
Higher Tier Paper 3A Marking Guide

<p>1. $\angle ACB = \angle ABC = 34$ $\angle BAC = 180 - (34 + 34) = 112$ $x = 360 - 112 = 248^\circ$</p>	<p>B1 M1 A1</p>	<p>Total 3</p>
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<p>2. $4p + 9 = -3$ $4p = -12$ $p = -3$</p>	<p>M1 M1 A1</p>	<p>Total 3</p>
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<p>3. (a) $\begin{array}{cccc} 56 & 28 & 14 & 7 \\ 2 & 2 & 2 & \\ 56 = 2^3 \times 7 & & & \end{array}$</p> <p>(b) $\begin{array}{cccc} 84 & 42 & 21 & 7 \\ 2 & 2 & 3 & \\ 84 = 2^2 \times 3 \times 7 & & & \\ \text{HCF} = 2^2 \times 7 = 28 & & & \end{array}$</p>	<p>M1 A1 M1 A1</p>	<p>Total 4</p>
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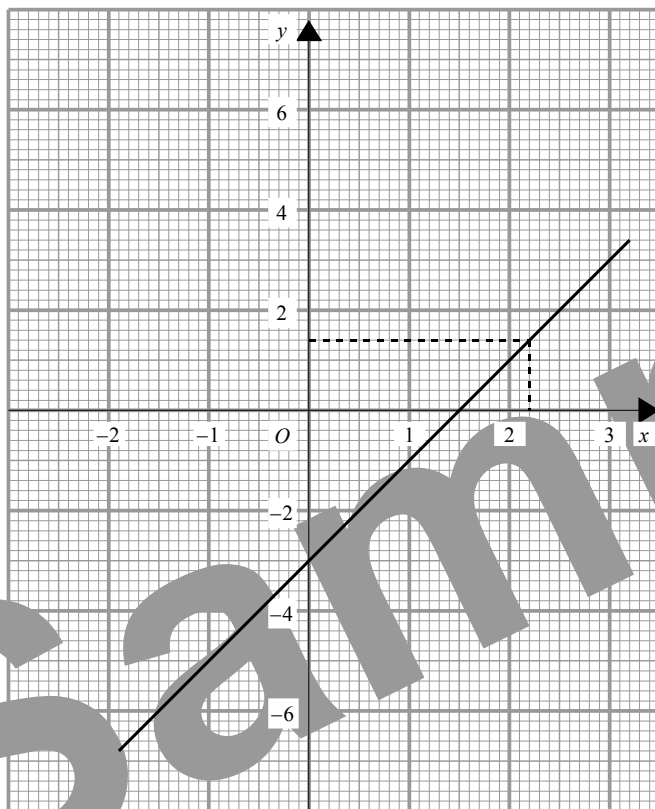
<p>4. $360 \div 720 = \frac{1}{2}$ multiply by $\frac{1}{2}$ to get angles: $50^\circ, 160^\circ, 120^\circ, 30^\circ$</p>	<p>M1 A1</p>
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B2

Total 4

5. (a)



B3

(b) $x = 2.2$

B1

Total 4

6. (a) $5 + 6 + 7 = 18$
 $36 \div 18 = 2$
 $6 \times 2 = 12$

M1

M1

A1

(b) 1 hour = 3×20 mins
average speed = $3 \times 5 = 15$ km/h

M1

A1

Total 5

7. (a) $10\% = 28\text{p}$, $5\% = 14\text{p}$, $2\frac{1}{2}\% = 7\text{p}$
VAT = $28\text{p} + 14\text{p} + 7\text{p} = 49\text{p}$
total cost = $\text{£}2.80 + 49\text{p} = \text{£}3.29$

M1

M1

A1

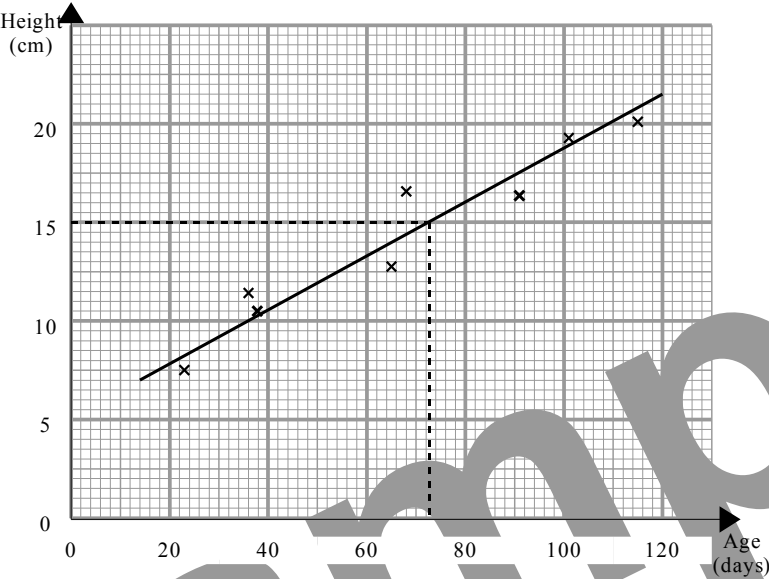
(b) $470 \div 40 = 11.7\dots$
 \therefore should buy 12 boxes

M1

A1

Total 5

8. (a) B1



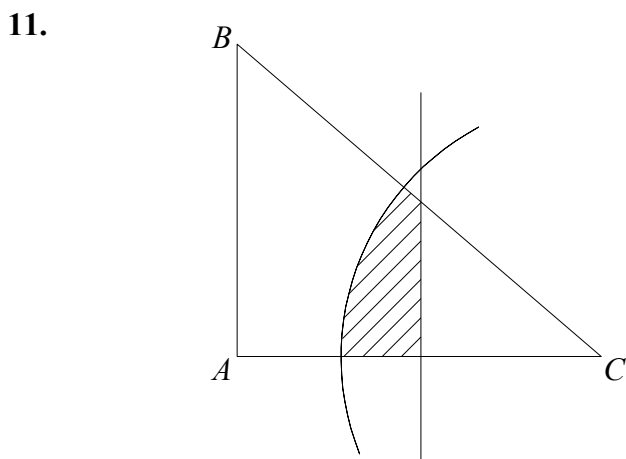
(b) positive B1

(c) (i) line of best fit M1
 from graph (about 72 days) A1

(ii) 24 cm is outside range of the data B1
 relationship may not be valid Total 5

9. by alternate angles, $\angle XYS = \angle YXN = 115$ M1
 bearing = $180 + 115 = 295^\circ$ A1 Total 2

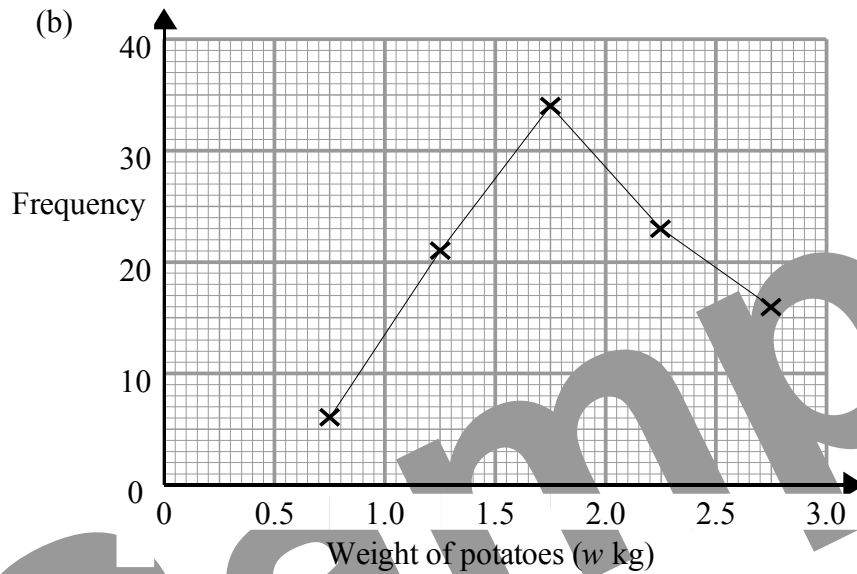
10. $\approx \frac{900 \times 30}{3^2}$ M1
 $= 100 \times 30$ M1
 $= 3000$ A1 Total 3



perpendicular bisector of AC M1
 arc, centre C, radius 5 cm M1
 accurate line and arc A1
 correct region shaded A1 Total 4

12. (a) 16%

B1



B2

Total 3

13. (a) $4a^2$

B1

(b) x^4

B1

(c) $3y^3 - 2y^2$

B1

(d) $= (x - 4)^2 - 16 + 19$

M1 A1

$= (x - 4)^2 + 3$

$a = -4, b = 3$

A1

Total 6

14. (a) (i) (90, 0)

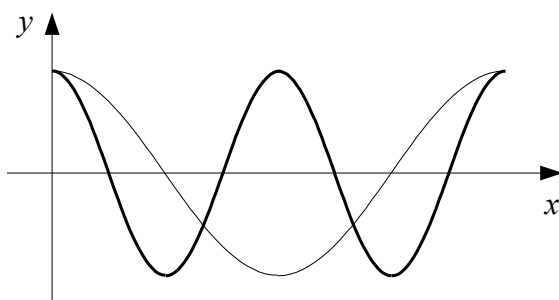
B1

(ii) (180, -1)

B1

(b)

B2



Total 4

15.

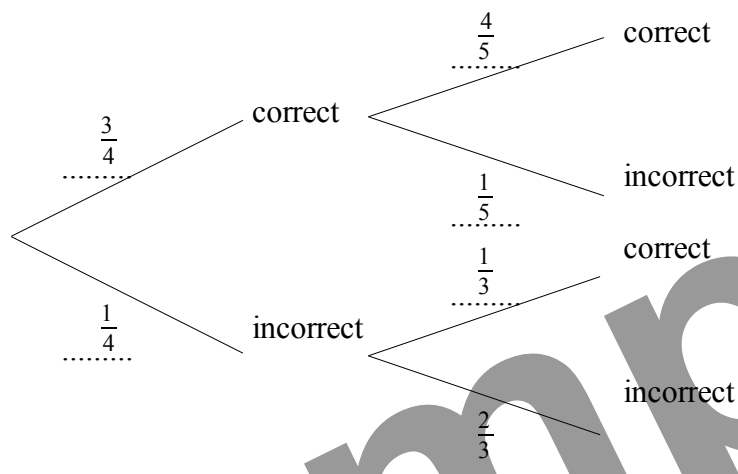
B3

πab	$\frac{a^2 c^2}{d}$	$2\pi b^3$	$abc + d$	$\frac{2d}{b^4}$	$b(c^2 + d^2)$	$c^3 + 2ab$
	✓	✓			✓	

Total 3

<p>16. $P + l = 2\pi r + 5r$ $P + l = r(2\pi + 5)$ $r = \frac{P + l}{2\pi + 5}$</p>	<p>M1 M1 A1</p>	<p>Total 3</p>
<p>17. (a) $x + x^2 + (3x - 2) = 30$ $x^2 + 4x - 2 = 30$ $x^2 + 4x - 32 = 0$</p> <p>(b) $(x + 8)(x - 4) = 0$ $x = -8$ (can't have age -8) or 4 when $x = 4$, ages are $4, 16$ and 10 \therefore oldest is 16 years</p>	<p>M1 A1 M1 A1 A1</p>	<p>Total 5</p>
<p>18. (a) $\frac{1}{3}$</p> <p>(b) $= \frac{18}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$ $= \frac{18\sqrt{3}}{3} = 6\sqrt{3}$</p>	<p>B1 M1 A1</p>	<p>Total 3</p>
<p>19. let smallest number be $2n$ where n is an integer next two are $2n + 2$ and $2n + 4$ sum is $2n + 2n + 2 + 2n + 4$ $= 6n + 6 = 6(n + 1)$ which is a multiple of 6</p>	<p>M1 M1 A1</p>	<p>Total 3</p>
<p>20. (a) (approx) -1.45 or 2.45</p> <p>(b) $2x - 2x^2 = 1 \Leftrightarrow 7 + 2x - 2x^2 = 8$ the curve does not intersect $y = 8$ \therefore no solutions</p>	<p>B1 M1 A1</p>	<p>Total 3</p>

21. (a) part (i) part (ii) B3



(b) $= \frac{3}{4} \times \frac{4}{5} = \frac{3}{5}$ M1 A1

(c) P(both incorrect) = $\frac{1}{4} \times \frac{2}{3} = \frac{1}{6}$ M1

P(at least one correct) = $1 - \frac{1}{6} = \frac{5}{6}$ A1

estimate = $\frac{5}{6} \times 180 = 150$ M1 A1

Total 9

22. volume of cylinder = $\pi r^2 h$ B1

volume of cone = $\frac{1}{3} \pi (2r)^2 H = \frac{4}{3} \pi r^2 H$ M1

$\pi r^2 h = 2 \times \frac{4}{3} \pi r^2 H$ M1

$h = \frac{8}{3} H \therefore H = \frac{3}{8} h$ A1

Total 4

23. (a) OP is radius and PQ is tangent $\therefore \angle OPQ = 90^\circ$ B1

$\angle ORP = \angle OPQ$ and $\angle POQ$ is common M1

angle sum of triangle = $180^\circ \therefore \angle OQP = \angle OPR$ A1

three equal angles \therefore triangles OPR and OPQ are similar

(b) $OQ^2 = OP^2 + PQ^2 = 5^2 + 12^2 = 169$ M1

$OQ = 13$ A1

$\frac{OR}{OP} = \frac{OP}{OQ}$ M1

$\frac{OR}{5} = \frac{5}{13} \therefore OR = \frac{25}{13}$ cm A1

Total 7

24. $(x - 1)^2 + (x + 1)^2 = 10^2$ M1

$x^2 - 2x + 1 + x^2 + 2x + 1 = 100$ M1

$2x^2 + 2 = 100$

$x^2 = 49$ A1

$x = \pm 7$, must be +7 for lengths to be positive

rectangle measures 6 cm by 8 cm M1

area = $6 \times 8 = 48$ cm² A1

Total 5

TOTAL FOR PAPER: 100 MARKS