



Mathematics

Paper 1

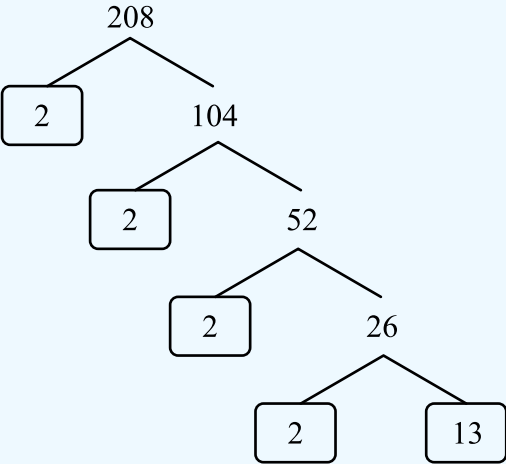
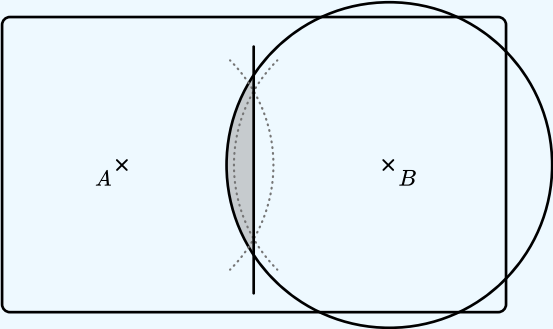
(Non-Calculator)

Higher Tier

Mark Scheme

AQA GCSE

SET 3

Question	Working	Answer	Notes
Q1		3.65×10^{-1}	A1 cao
Q2		$y = 3x + 2$	B1 $y = 3x + c$ for any value of c
Q3	$1.5^2 = 1.5 \times 1.5 = 2.25$	2.25	A1 cao
Q4		SAS	B1 cao
Q5		$2^4 \times 13$	M1 Attempt at prime factor tree or other valid method A1 $2^4 \times 13$ in index form
Q6			B1 Perpendicular bisector of AB constructed (construction lines must be seen) B1 Circle or part circle, radius $4cm$ around B B1 Correct area shaded

Question	Working	Answer	Notes																																			
Q7	$300 \div 3 = 100$ $100 \times 50p = \text{£}50$ $50 - 40 = 10$, profit = £10 $\frac{10}{40} \times 100 = 25\%$	25%	M1 $300 \div 3 = 100$ or $100 \times 50p = \text{£}50$ M1 $50 - 40 = 10$, profit = £10 M1 Attempt to find £10 as a percentage of £40 A1 cao																																			
Q8	Angle $BHG = 90^\circ$ Interior angle of a hexagon: $\frac{4 \times 180}{6} = 120^\circ$ Angle $ABH = 120 - 90 = 30$ $90 = 3 \times 30$ so angle $BHG = 3 \times \text{angle } ABH$		B1 Angle $BHG = 90^\circ$ M1 Attempt at a correct method to find the interior angle of a hexagon (= 120°) M1 <i>ft</i> Angle $ABH = \text{their '120' } - 90$ B1 Concluding statement																																			
Q9	Total height of boys: $6 \times 130 = 780$ Total height of girls: $4 \times 120 = 480$ Total height of 10 players: $780 + 480 = 1260$ Mean height of 10 players: $\frac{1260}{10} = 126$	Yes	M1 $6 \times 130 = 780$ or $4 \times 120 = 480$ M1 $780 + 480$ (= 1260) M1 $1260 \div 10$ (= 126) A1 126 from correct working and concludes ‘Yes’																																			
Q10	<table><tr><th>Sequence</th><th>1st term</th><th>2nd term</th><th>3rd term</th><th>4th term</th><th>5th term</th><th>nth term</th></tr><tr><td>A</td><td>3</td><td>7</td><td>11</td><td>15</td><td>19</td><td>$4n - 1$</td></tr><tr><td>B</td><td>1</td><td>4</td><td>9</td><td>16</td><td>25</td><td>n^2</td></tr><tr><td>C</td><td>$\frac{1}{3}$</td><td>1</td><td>3</td><td>9</td><td>27</td><td>3^{n-2}</td></tr><tr><td>D</td><td>$\frac{2}{3}$</td><td>3</td><td>6</td><td>7</td><td>-2</td><td>$n^2 - 3^{n-2}$</td></tr></table>	Sequence	1st term	2nd term	3rd term	4th term	5th term	n th term	A	3	7	11	15	19	$4n - 1$	B	1	4	9	16	25	n^2	C	$\frac{1}{3}$	1	3	9	27	3^{n-2}	D	$\frac{2}{3}$	3	6	7	-2	$n^2 - 3^{n-2}$	$19, 25$ $4n - 1$ n^2 3^{n-2} $n^2 - 3^{n-2}$	A1 1st row correct A1 2nd row correct A1 3rd row correct A1 4th row correct
Sequence	1st term	2nd term	3rd term	4th term	5th term	n th term																																
A	3	7	11	15	19	$4n - 1$																																
B	1	4	9	16	25	n^2																																
C	$\frac{1}{3}$	1	3	9	27	3^{n-2}																																
D	$\frac{2}{3}$	3	6	7	-2	$n^2 - 3^{n-2}$																																

Question	Working	Answer	Notes
Q11	$\frac{28}{36} : \frac{22}{40} : \frac{16}{30} = \frac{280}{360} : \frac{198}{360} : \frac{192}{360}$ $= 280:198:192$ $= 140:99:96$	140:99:96	M1 $\frac{28}{36}, \frac{22}{40}, \frac{16}{30}$ M1 Writes fractions with common denominator M1 280:198:192 oe A1 cao
Q12a	$3 \times 4 = 12$ $12p^{2+3} q^{1+2} = 12p^5 q^3$	$12p^5 q^3$	M1 12 or p^5 or q^3 seen A1 cao
Q12b	$a = 4(2m^2)^3$ $a = 4 \times 8m^6$ $a = 32m^6$	$a = 32m^6$	M1 $a = 4(2m^2)^3$ A1 cao
Q12c	$32^{\frac{1}{2}} \times 2^{-2} = (2^5)^{\frac{1}{2}} \times 2^{-2}$ $= 2^{\frac{5}{2}} \times 2^{-2}$ $= 2^{\frac{1}{2}}$ <p>Or</p> $4\sqrt{2} \times \frac{1}{4} = \sqrt{2} = 2^{\frac{1}{2}}$	$2^{\frac{1}{2}}$	M1 Writes 32 as 2^5 or $4\sqrt{2}$ M1 Writes $\frac{1}{2^2}$ in a form which allows them to simplify the expression A1 cao

Question	Working	Answer	Notes														
Q13	$A: \frac{1}{2} \times \pi \times 2^2 \times 9 = 18\pi$ $B: \frac{4}{3} \times \pi \times 3^3 = 36\pi$	2 times bigger	M1 $\frac{1}{2} \times \pi \times 2^2 \times 9 (= 18\pi)$ or $\frac{4}{3} \times \pi \times 3^3 (= 36\pi)$ M1 18π and 36π A1 $36\pi \div 18\pi (= 2)$ A1 cao														
Q14a	<table border="1"><thead><tr><th>Age, A</th><th>$A \leq 40$</th><th>$A \leq 80$</th><th>$A \leq 120$</th><th>$A \leq 160$</th><th>$A \leq 200$</th><th>$A \leq 240$</th></tr></thead><tbody><tr><td>CF</td><td>13</td><td>41</td><td>64</td><td>73</td><td>78</td><td>80</td></tr></tbody></table>	Age, A	$A \leq 40$	$A \leq 80$	$A \leq 120$	$A \leq 160$	$A \leq 200$	$A \leq 240$	CF	13	41	64	73	78	80		A1 cao
Age, A	$A \leq 40$	$A \leq 80$	$A \leq 120$	$A \leq 160$	$A \leq 200$	$A \leq 240$											
CF	13	41	64	73	78	80											
Q14b			M1 At least 4 points plotted correctly A1 All points correct and joined with an appropriate curve														

Question	Working	Answer	Notes
<p>Q14c</p>	<p>54 trees less than 100 years old $80 - 54 = 26$ trees over 100 years old</p>	$\frac{26}{80}$	<p>M1 Line drawn at 100 years and value of 25 - 27, read from their graph</p> <p>M1 Subtracts their '26' from 80</p> <p>A1 $\frac{26}{80}$ oe</p>
<p>Q15</p>	<p>$x = 0.4353535\dots$ $10x = 4.353535\dots$ $1000x = 435.353535\dots$ $1000x - 10x = 431$ $990x = 431$ $x = \frac{431}{990}$</p>	$\frac{431}{990}$	<p>M1 $10x$ and $1000x$ seen</p> <p>M1 Attempt to subtract $10x$ from $1000x$</p> <p>A1 Correct fraction with correct steps shown</p>

Question	Working	Answer	Notes
Q16	$\sin(30) = \frac{1}{2}, \cos(30) = \frac{\sqrt{3}}{2}$ $6 \times \frac{1}{2} \times 2 \times \frac{\sqrt{3}}{2} = 6 \times \frac{\sqrt{3}}{2} = 3\sqrt{3}$	$a = 3$	M1 $\sin(30) = \frac{1}{2}, \cos(30) = \frac{\sqrt{3}}{2}$ seen or implied M1 $6 \times \frac{1}{2} \times 2 \times \frac{\sqrt{3}}{2}$ A1 cao
Q17	$0.6 \times 0.4 + 0.4 \times 0.1 = 0.24 + 0.04$ $= 0.28$	0.28	M1 $0.6 \times 0.4 (= 0.24)$ M1 $0.4 \times 0.1 (= 0.04)$ M1 $0.24 + 0.04$ A1 cao
Q18	$P = \frac{k}{Q^2}$ $1.5 = \frac{k}{10^2}, k = 1.5 \times 100 = 150$ $P = \frac{150}{5^2} = \frac{150}{25} = 6$	$P = 6$	M1 $1.5 = \frac{k}{10^2}$ or $k = 150$ M1 $P = \frac{150}{25}$ oe A1 cao
Q19	$(x+5)^2 + (x-2)^2 = (x+6)^2$ $x^2 + 10x + 25 + x^2 - 4x + 4 = x^2 + 12x + 36$ $x^2 - 6x - 7 = 0$ $(x+1)(x-7) = 0$ $x = -1$ (invalid) or $x = 7$	$x = 7$	M1 $(x+5)^2 + (x-2)^2 = (x+6)^2$ oe M1 $x^2 - 6x - 7 = 0$ M1 Valid attempt to solve their quadratic A1 cao (must disregard $x = -1$)

Question	Working	Answer	Notes
Q20	$b = -6$ $0 = 1^2 + a - 6, a = 5$ $y = x^2 + 5x - 6$ $y = \left(x + \frac{5}{2}\right)^2 - \left(\frac{5}{2}\right)^2 - 6$ $y = \left(x + \frac{5}{2}\right)^2 - \frac{49}{4}$	$\left(-\frac{5}{2}, -\frac{49}{4}\right)$	M1 $b = -6$ M1 $0 = 1^2 + a - 6, a = 5$ M1 Completes square or uses other method to determine x coordinate $= -\frac{5}{2}$ A1 cao
Q21	$x = 3y$ $2x + 2z = 26 \Rightarrow 6y + 2z = 26$ $y + 2z = 11$ $5y = 15$ $y = 3$ $x = 3 \times 3 = 9$ $3 + 2z = 11$ $z = 4$	$x = 9$ $y = 3$ $z = 4$	M1 $2x + 2z = 26$ or $y + 2z = 11$ M1 $2x + 2z = 26$ and $y + 2z = 11$ M1 $x = 3y$ and substitutes into one of the first to equations to get 2 equations in 2 variables M1 Valid attempt to solve simultaneous equations A1 cao
Q22	$M = \frac{\sqrt{90}}{2 + \sqrt{10}} = \frac{3\sqrt{10}}{2 + \sqrt{10}}$ $= \frac{3\sqrt{10}(2 - \sqrt{10})}{(2 + \sqrt{10})(2 - \sqrt{10})}$ $= \frac{6\sqrt{10} - 30}{4 - 10}$ $= \frac{6\sqrt{10} - 30}{-6}$ $= 5 - \sqrt{10}$	$5 - \sqrt{10}$	M1 $M = \frac{\sqrt{90}}{2 + \sqrt{10}}$ M1 Multiplies by $\frac{2 - \sqrt{10}}{2 - \sqrt{10}}$ M1 Reaches $\frac{6\sqrt{10} - 30}{-6}$ A1 cao

Question	Working	Answer	Notes
Q23a	$A = h \times b \Rightarrow 54 = h \times b$ $h = \frac{54}{b}$		A1 Correct step to rearrange shown
Q23b	$2h + 2b = 33$ $2\left(\frac{54}{b}\right) + 2b = 33$ $108 + 2b^2 = 33b$ $2b^2 - 33b + 108 = 0$ $(2b - 9)(b - 12) = 0$ $b = \frac{9}{2}$ or $b = 12$	$\frac{9}{2}$ and 12	M1 $2h + 2b = 33$ and substitutes $\frac{54}{b}$ M1 Reaches $2b^2 - 33b + 108 = 0$ A1 cao

Help ease the pressure with a personalised revision programme for each of your target KS4 students

Our one to one GCSE revision programme is designed to help your target students reach their potential in their GCSE maths exams.

Our specialist maths tutors work one to one with each student, focusing on securing core KS4 content and building familiarity with the kinds of questions they'll be tackling in their GCSE exams.

Get in touch today:

✉ hello@thirdspacelearning.com

🔍 thirdspacelearning.com

☎ 0203 771 0095