



THIRD SPACE
LEARNING

Mathematics

Paper 1

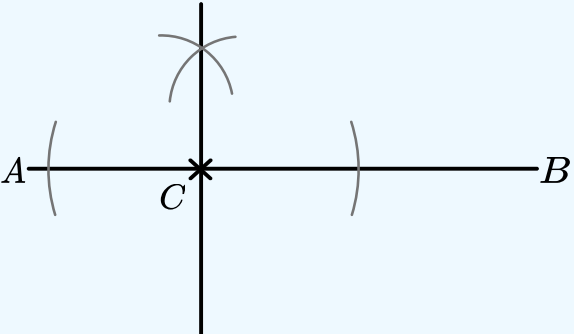
(Non-Calculator)

Higher Tier

Mark Scheme

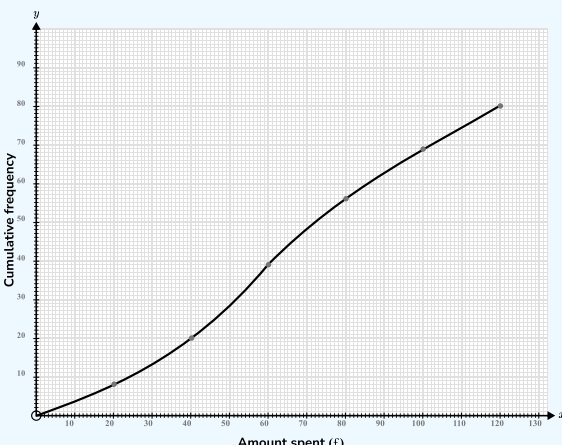
Edexcel GCSE

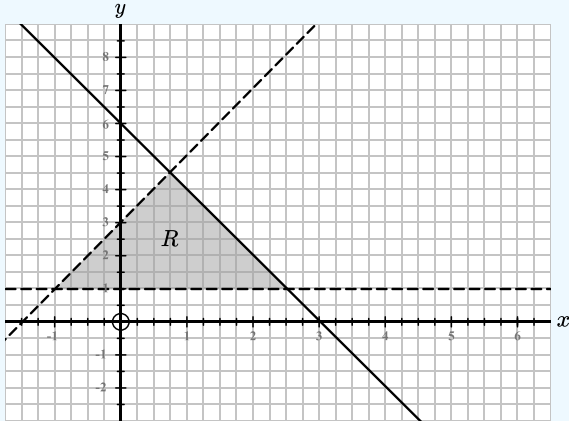
SET 2

Question	Working	Answer	Notes
Q1	Factors of 64: 1, 2, 4, 8, 16, 32, 64 Factors of 80: 1, 2, 4, 5, 8, 10, 16, 20, 40, 80	16	M1 Factors of 64 and 80 listed (allow up to one of each missing) or prime factor trees for both 64 and 80 drawn (allow one minor error) A1 cao
Q2	$\frac{90}{360} = \frac{1}{4}, \frac{1}{4} \text{ of } 60 = 15$ $\frac{60}{360} = \frac{1}{6}, \frac{1}{6} \text{ of } 60 = 10$ $60 - 15 - 10 = 35$ $15 \times 2.1 = 31.5$ $10 \times 3.5 = 35$ $35 \times 4 = 140$ $31.5 + 35 + 140 = 206.5g$	206.5g	M1 Number of small marbles = 15 M1 Number of medium marbles = 10, number of large marbles = 35 M1 <i>ft</i> Attempt to multiply numbers of marbles by weights A1 cao
Q3a		0.000038	B1 cao
Q3b	$2 \times 4.1 = 8.2$ $10^2 \times 10^5 = 10^7$	8.2×10^7	M1 8.2 or 10^7 seen A1 cao
Q4			M1 Equidistant arcs either side of C seen M1 Attempt at two more arcs above or below AB A1 Correct construction with all construction lines visible

Question	Working	Answer	Notes
Q5	<p>The boys had more higher values than the girls</p> <p>The highest value was higher for the boys than the girls</p> <p>The median was higher for the boys than for the girls</p> <p>The range of times was greater for the boys</p>		<p>A1 One correct comparative statement</p> <p>A1 At least two correct comparative statements</p>
Q6a	Number of prime numbers: 4	$\frac{4}{10}$	<p>M1 4 prime numbers, or 2, 3, 5, 7 seen</p> <p>A1 $\frac{4}{10}$ oe</p>
Q6b	$200 \times 0.50 = \text{£}100$ Expected wins: $\frac{4}{10} \times 200 = 80$ $\text{£}100 - 80 = \text{£}20$	£20	<p>M1 $200 \times 0.50 = \text{£}100$</p> <p>M1 Expected number of wins 80</p> <p>A1 cao</p>
Q7a		$\frac{1}{2}$	B1 cao
Q7b	$\sin(30) = \frac{6}{H}$ $\frac{1}{2} = \frac{6}{H}$ $H = 12$ Area = $\frac{1}{2} \times 12 \times 10.4$ $= 62.4\text{cm}^2$	62.4cm^2	<p>M1 $\sin(30) = \frac{6}{H}$ oe seen</p> <p>A1 $H = 12$</p> <p>M1 <i>ft</i> Area = $\frac{1}{2} \times 12 \times 10.4$</p> <p>A1 cao</p>

Question	Working	Answer	Notes														
Q8a		1	B1 cao														
Q8b	$(\sqrt[3]{125})^2 = 5^2 = 25$	25	M1 5 seen A1 cao														
Q8c	$\frac{1}{3^2} = \frac{1}{9}$	$\frac{1}{9}$	A1 cao														
Q9	Butter: $300 \div 120 = 2.5$ $2.5 \times 12 = 30$ cupcakes Eggs: $6 \div 2 = 3$ $3 \times 12 = 36$ cupcakes	30	M1 Finds correct number of cupcakes for the amount of butter or the amount of eggs A1 cao														
Q10	$a = 7b, b = 5c$ $a = 7(5c)$ $a = 35c$	$a = 35c$	M1 $a = 7b$ and $b = 5c$ A1 cao														
Q11a	<table><tr><th>Amount spent (£s)</th><th>Cumulative frequency</th></tr><tr><td>$0 \leq s < 20$</td><td>8</td></tr><tr><td>$20 \leq s < 40$</td><td>20</td></tr><tr><td>$40 \leq s < 60$</td><td>39</td></tr><tr><td>$60 \leq s < 80$</td><td>56</td></tr><tr><td>$80 \leq s < 100$</td><td>69</td></tr><tr><td>$100 \leq s < 120$</td><td>80</td></tr></table>	Amount spent (£s)	Cumulative frequency	$0 \leq s < 20$	8	$20 \leq s < 40$	20	$40 \leq s < 60$	39	$60 \leq s < 80$	56	$80 \leq s < 100$	69	$100 \leq s < 120$	80		A1 all cumulative frequencies correctly filled
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Question	Working	Answer	Notes
Q11b 			<p>M1 <i>ft</i> At least 4 of their points plotted correctly</p> <p>A1 All points correct and joined by a curve</p>
Q11c	<p>Median on Saturday £61</p> <p>The median on Saturday was much higher</p>		<p>M1 Median for Saturday in range £60 - £63</p> <p>A1 A correct comparative statement</p>
Q12	<p>Area of pentagon A: 100</p> <p>Area of pentagon B: 150</p> <p>Area of pentagon C: 40% of 150 = 60,</p> <p>150 + 60 = 210</p> <p>100 : 150 : 210 = 10 : 15 : 21</p>	<p>10 : 15 : 21</p>	<p>M1 Scaling up area of pentagon A to give area of pentagon B (150%)</p> <p>M1 Increasing area of pentagon B by 40% to give 210%</p> <p>M1 Writing in a ratio</p> <p>A1 Correct, simplified ratio</p>
Q13a	$\frac{6x - 6}{(x + 2)(x - 1)} + \frac{5x + 10}{(x + 2)(x - 1)} = \frac{11x + 4}{(x + 2)(x - 1)}$	$\frac{11x + 4}{(x + 2)(x - 1)}$	<p>M1 Correct common denominator of $(x + 2)(x - 1)$ oe</p> <p>M1 Numerators $6x - 6$ and $5x + 10$ oe</p> <p>A1 cao</p>

Question	Working	Answer	Notes
Q13b	$\frac{(x+4)(x-4)}{(x+4)(x-7)} = \frac{x-4}{x-7}$	$\frac{x-4}{x-7}$	<p>M1 Numerator or denominator factorised correctly</p> <p>M1 Both numerator and denominator factorised correctly</p> <p>A1 cao</p>
Q14			<p>M1 One line correctly drawn</p> <p>M1 All three lines correctly drawn</p> <p>A1 Correct region shaded and labelled <i>R</i></p>
Q15	$\frac{\pi \times 10}{2} = 5\pi$ $\frac{\pi \times 4}{2} = 2\pi$ $5\pi + 2\pi + 6 = 7\pi + 6$	$7\pi + 6$	<p>M1 Outer perimeter $\frac{\pi \times 10}{2} = 5\pi$</p> <p>M1 Inner perimeter $\frac{\pi \times 4}{2} = 2\pi$</p> <p>M1 <i>ft</i> their outer + their inner + 6</p> <p>A1 Correct answer in terms of π</p>

Question	Working	Answer	Notes
Q16	$\frac{80}{x} = \frac{6}{120}$ $x = \frac{80 \times 120}{6} = 1600$	1600	M1 $\frac{80}{x} = \frac{6}{120}$ oe M1 $\frac{80 \times 120}{6}$ oe seen A1 cao
Q17	<p>Angle CAD = 23° (angles in the same segment are equal)</p> <p>Angle ADC = $180 - 67 - 23 = 90^\circ$</p> <p>The angle subtended by a diameter is 90° so AC is a diameter</p>		<p>M1 Angle CAD = 23° (angles in the same segment are equal). May be seen on diagram.</p> <p>M1 Angle ADC = $180 - 67 - 23 = 90^\circ$</p> <p>May be seen on diagram.</p> <p>B1 Correctly stating that angle subtended by a diameter is 90° so AC is a diameter following correct working</p>
Q18	$\frac{2\sqrt{60} - \sqrt{15}}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{300} - \sqrt{75}}{5}$ $= \frac{2 \times 10\sqrt{3} - 5\sqrt{3}}{5}$ $= \frac{15\sqrt{3}}{5}$ $= 3\sqrt{3}$	$3\sqrt{3}$	<p>M1 Multiply numerator and denominator by $\sqrt{5}$</p> <p>or $\frac{3\sqrt{15}}{\sqrt{5}}$ seen</p> <p>M1 $\frac{2\sqrt{300} - \sqrt{75}}{5}$ or $\frac{3\sqrt{75}}{5}$ seen</p> <p>M1 $\frac{15\sqrt{3}}{5}$ seen</p> <p>A1 cao following fully correct working</p>
Q19	$x^2 - 6x + 15 = (x - 3)^2 - 9 + 15$ $= (x - 3)^2 + 6$	$a = 3, b = 6$	<p>M1 $(x - 3)^2$</p> <p>A1 cao</p>
Q19b i		(3, 6)	B1 cao

Question	Working	Answer	Notes
Q19 ii	The turning point is above the x axis and the coefficient of x^2 is positive so $y = x^2 - 6x + 15$ doesn't cross the axis and $x^2 - 6x + 15 = 0$ has no solutions		B1 Correct explanation
Q20a	$f^{-1}(x) = \frac{x-2}{3}$ $f^{-1}(44) = 14$	14	M1 $f^{-1}(x) = \frac{x-2}{3}$ M1 <i>ft</i> Substituting 44 into their $f^{-1}(x)$ A1 cao
Q20b	$gf(x) = (3x+2)^2 + 3x+2$ $= 9x^2 + 12x + 4 + 3x + 2$ $= 9x^2 + 15x + 6$ $9x^2 + 15x + 6 = 0$ $3x^2 + 5x + 2 = 0$ $(3x+2)(x+1) = 0$ $x = -\frac{2}{3}$ or $x = -1$	$x = -\frac{2}{3}$ or $x = -1$	M1 $gf(x) = (3x+2)^2 + 3x+2$ M1 Simplify to $gf(x) = 9x^2 + 15x + 6$ M1 <i>ft</i> Valid attempt to solve their $gf(x) = 0$ A1 cao
Q21	$20 \times 60 \times 20 = 24000l$ $24000 \div 1000 = 24m^3$ $\frac{1}{2}(h+h-0.8) \times 10 \times 5 = 24$ $2h-0.8 = 0.96$ $2h = 1.76$ $h = 0.88m$	0.88m	M1 $20 \times 60 \times 20 = 24000l$ M1 $h - 0.8$ identified as height on shallower side of pool M1 $\frac{1}{2}(h+h-0.8) \times 10 \times 5 = 24$ M1 Attempt to solve to give h A1 cao

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