



THIRD SPACE
LEARNING

Mathematics

Paper 1

(Non-Calculator)

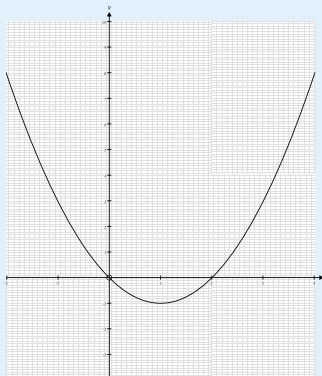
Higher Tier

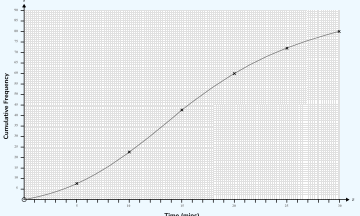
Mark Scheme

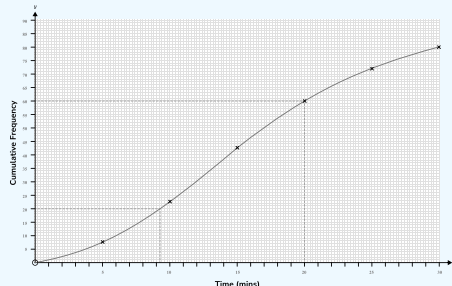
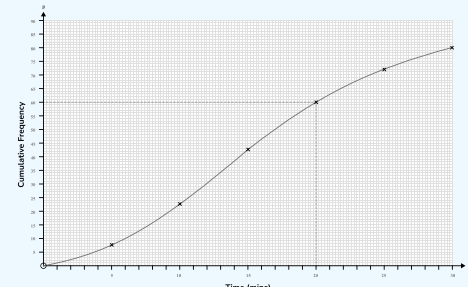
Edexcel GCSE

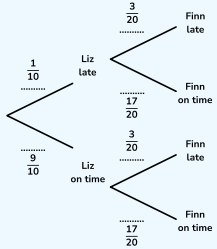
SET 1A

Question	Working	Answer	Notes
Q1	$3y-12<6$ $3y<18$ $y<6$	$y<6$	M1 Correctly expanding brackets A1 cao
Q2		$2^2 \times 3 \times 5 \times 7$	M1 Prime factor tree resulting in the prime factors 2, 2, 3, 5, 7 A1 cao
Q3a		4.72×10^6	B1 cao
Q3b		0.0071	B1 cao
Q3c	$46000 + 512000 = 558000$ or $0.46 \times 10^5 + 5.12 \times 10^5 = 5.58 \times 10^5$	5.58×10^5	M1 Correctly writing both numbers as ordinary numbers or both with the same power of 10 A1 cao
Q4a		$\frac{5}{8}$	B1 cao
Q4b	Farm A: $\frac{4}{5}$ of 120=96 96 in the ratio 3:5=36:60 $36 \times 1 + 60 \times 2 = 156$ lambs Farm B: 60% of 200=120 25% of 120=30 $30 \times 2 + 89 \text{ } 1+3=152$	Farm A	M1 156 lambs on farm A seen M1 152 lambs on farm B seen A1 cao with all working correct

Question	Working	Answer	Notes																
Q5	$5^2 + 12^2 = 25 + 144 = 169$ $13^2 = 169$	Yes it is since Pythagoras' theorem works	M1 Attempt at applying Pythagoras' theorem A1 Yes with correct working seen																
Q6a	<table><tr><td>x</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>y</td><td>8</td><td>3</td><td>0</td><td>-1</td><td>0</td><td>3</td><td>8</td></tr></table>	x	-2	-1	0	1	2	3	4	y	8	3	0	-1	0	3	8	3, -1, 0	M1 at least 2 values correct A1 cao
x	-2	-1	0	1	2	3	4												
y	8	3	0	-1	0	3	8												
Q6b			M1 Points plotted followed through from their table. Allow one error in plotting A1 fully correct curve																
Q6c		$x=0$ and $x=2$	B1 cao																
Q7	$4 \times 180 = 720$ $39 + 157 + 50 + 140 + 19 = 405$ $720 - 405 = 315^\circ$	315°	B1 720° M1 Attempt to subtract the other values from a total angle. Doesn't have to be 720° . Must subtract 5 values A1 cao																
Q8	<table><tr><td></td><td>Letter of equation</td></tr><tr><td>y is directly proportional to x</td><td>C</td></tr><tr><td>y is inversely proportional to x</td><td>A</td></tr><tr><td>y is inversely proportional to x^2</td><td>D</td></tr></table>		Letter of equation	y is directly proportional to x	C	y is inversely proportional to x	A	y is inversely proportional to x^2	D		B1 one correct B1 two correct B1 all correct								
	Letter of equation																		
y is directly proportional to x	C																		
y is inversely proportional to x	A																		
y is inversely proportional to x^2	D																		

Question	Working	Answer	Notes
Q9a	$\frac{1}{2}(x+2)(x+4) = 24$ $x^2 + 6x + 8 = 48$ $x^2 + 6x - 40 = 0$	$2n + 1$	M1 $\frac{1}{2}(x+2)(x+4)$ oe A1 Appropriate steps for proof
Q9b	$(x+10)(x-4)=0$ $x = -10$ (invalid) or $x=4$ $x+2=6$, $x+4=8$, $x+6=10$ $6+8+10=24$	24cm	M1 Attempting to factorise and solve A1 cao
Q10	$\sin(30)=0.5$ $\tan(45)=1$	1.5	M1 either $\sin(30)=0.5$ or $\tan(45)=1$ seen A1 cao
Q11	$13 \times 7 = 91$ $91 - (12+14+17+11+15+10) = 12$	12	M1 $13 \times 7 = 91$ A1 cao
Q12a		$t=3s$	B1 cao
Q12b		-2	M1 Appropriate tangent drawn at $t=8$ and two points selected with attempt to calculate gradient A1 accept answers in range -1.8 to -2.2
Q13a		8, 22, 43, 60, 71 80	B1 cao
Q13b			M1 Points plotted correctly ft from their part a A1 Correct points joined with a curve

Question	Working	Answer	Notes
<div>Q13c</div> <div></div> <div>10.3-10.7</div>		10.6 minutes	M1 horizontal lines drawn at 20 or 60 A1 cao
<div>Q13d</div> <div></div> <div>80-65=15 $\frac{15}{80}=18.75\%$ 10% of 80=8</div>		N0 there are 15 children who travel more than 22 minutes and 10% of children is 8	M1 vertical line drawn at 22 minutes M1 10% is 8 A1 No and 15-17 and 8
<div>Q14a</div> <div>$\frac{7}{4} \times \frac{11}{5} = \frac{77}{20} = 3\frac{17}{20}$</div>		$3\frac{17}{20}$ or $\frac{77}{20}$	M1 Attempting to convert fractions to mixed numbers A1 cao

Question	Working	Answer	Notes
Q14b	$\frac{4x+1}{2} + \frac{3x-1}{5} = \frac{5(4x+1)}{10} + \frac{2(3-1)}{10}$ $= \frac{20x+5+6x-2}{10} = \frac{26x+3}{10}$	$\frac{26x+3}{10}$	M1 Writing both fractions over a common denominator A1 cao
Q15	$6x^2 = 150$ $x^2 = 25$ Side length = 5cm^3 Volume: $5 \times 5 \times 5 = 125\text{cm}^3$ Mass: $125 \times 0.8 = 100\text{g}$	100g	M1 Dividing by 6 to find the area of one face M1 Side length=5cm M1 Volume=125cm ³ A1 cao
Q16	$x = 0.45454545\dots$ $100x = 45.45454545\dots$ $99x = 45$ $x = \frac{45}{99} = \frac{5}{11}$		M1 Subtracting 0.454545.... from 45.454545... A1 $99x=45$ or $\frac{45}{99}$ seen and relevant steps shown
Q17a			M1 at least two values correct A1 cao
Q17b	$\frac{1}{10} \times \frac{3}{20} + \frac{1}{10} \times \frac{17}{20} + \frac{9}{10} \times \frac{3}{20} = \frac{47}{200}$ or $1 - \frac{9}{10} \times \frac{17}{20} = 1 - \frac{153}{200} = \frac{47}{200}$	$\frac{47}{200}$	M1 At least one combination correctly calculated A1 cao

Question	Working	Answer	Notes
Q18a	$16^{\frac{3}{2}} = 4^3 = 64$	64	M1 $\sqrt{64}=4$ or $16^3 = 4096$ seen A1 cao
Q18b	$\frac{2^3 \times 2^{-1}}{2^4} = 2^{-2} = \frac{1}{4}$	$\frac{1}{4}$	M1 2^{-2} seen A1 cao
Q19	$(3 + \sqrt{2})(4 + \sqrt{8}) = 12 + 4\sqrt{2} + 3\sqrt{8} + \sqrt{16}$ $= 12 + 4\sqrt{2} + 3 \times 2\sqrt{2} + 4$ $= 16 + 10\sqrt{2}$	$= 16 + 10\sqrt{2}$	M1 At least three terms correct in the expansion M1 $\sqrt{8} = 2\sqrt{2}$ A1 cao
Q20	Gradient of radius from origin to (2,2): $\frac{2-0}{2-0}$ $=1$ Gradient of tangent: -1 $y = -x + c$ $2 = -2 + c$ $c = 4$ $y = -x + 4$	$y = -x + 4$	M1 Attempt to calculate gradient of radius M1 Gradient of tangent = -1 M1 Substituting -1 and the coordinate (2, 2) into $y=mx+c$ A1 cao
Q21a	$\frac{\theta}{360} \times \pi \times 10^2 = 20$ $\theta = \frac{72}{\pi}$	$\frac{72}{\pi}$	M1 $\frac{\theta}{360} \times \pi \times 10^2$ A1 cao
Q21b	Unshaded area: $\frac{72}{360} \times \pi \times 5^2 = 5$ or Unshaded area: $20 \div 2^2 = 5$ $20 - 5 = 15$	15cm^2	M1 Attempting to use the angle from part a to find the unshaded area Or use of similar shapes to find area M1 5 seen for unshaded area A1 cao

Question	Working	Answer	Notes
Q21c	$15:5 = 3:1$	$3:1$	B1 cao
Q22	$\overrightarrow{DC} = -2a + b + a = b - a$ $\overrightarrow{DM} = \frac{1}{2}b - \frac{1}{2}a$ $\overrightarrow{ND} = \frac{3}{4}(2a) = \frac{3}{2}a$ $\overrightarrow{NM} = \frac{3}{2}a + \frac{1}{2}b - \frac{1}{2}a = a + \frac{1}{2}b$	$a + \frac{1}{2}b$	M1 Correct vector for DC or CD M1 Correct vector for DM M1 Attempting to add ND and DM oe A1 cao

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