Question	Working	Answer	Mark	Notes
6 (a)			3	B3 fully correct B2 for 6 or 7 correct entries B1 for 3, 4 or 5 correct entries Allow 4,3 and 11 instead of $11-x, x-4, 18-x$.
(b)	$11-x+x-4+18-x+3+4+2+3+5=35$			M1 Sum of all their 8 values = 35 or "their 3" + "their 4"
		7	2	A1
(c)(i) (ii)		19 10	2	B1ft B1 ft
(d)		$\dfrac{5}{14}, \dfrac{3}{9}, \dfrac{1}{5}$	2	B2 for all of $\dfrac{5}{14}, \dfrac{3}{9}, \dfrac{1}{5}$ B1 for 1 correct
(e)	$\dfrac{9}{14} \times \dfrac{6}{9} + \dfrac{5}{14} \times \dfrac{4}{5}$ oe			M1 Correct method using their prob from tree diagram DO Not ISW
		$\dfrac{5}{7}$	2	A1 oe allow 0.71 or better

Question	Working	Answer	Mark	Notes
7 (a)		The angle between a <u>radius</u> and a <u>tangent</u> is <u>90°</u>	1	B1 Oe
(b)	e.g. $\tan 27° = \dfrac{OC}{12}$ or $\tan 63° = \dfrac{12}{OC}$ $OC = 12\tan 27°$ or $OC = \dfrac{12}{\tan 63°}$ (=6.11..) $0.5 \times 12 \times 12 \tan 27°$ oe	36.7 cm²	4	M1 for correct use of trig M1 correct equation for OC M1 A1 awrt 36.7 /36.8
(c)	$AOC = 126°$ or DOC and DOA both marked or stated as 63° for <u>angles</u> in a <u>triangle</u> total 180° , $EOC = AOE$ as $AO = CO$, $EA = EC$ and EO is a common side and <u>angle at centre</u> is twice angle at <u>circumference</u>. oe	63° Correct reasons for their method	4	M1 0.5 × 126 A1 B2 (B1 for one correct reason)
(d)	$180 – \text{“63”}$ or $0.5 \times (360 – 2 \times \text{“63”})$	117°	2	M1 180 – their (c) A1
(e)	OCB $= 90 – 59$ (31) $BAC = 59$ $OAC =$ $(180 – 2 \times \text{“63”}) \div 2$ $(=27)$ reflex $AOC =$ $360 – 2 \times \text{“63”}$ $(=234)$ $OCB = 90 – 59$ $(=31)$ $BAO =$ $\text{“63”} – 31$ $BAO = 59 – \text{“27”}$ $360 – \text{“63”} –$ $\text{“234”} – \text{“31”}$			M1 1 of the angles. May be on diagram M1
		32°	3	A1

Question	Working	Answer	Mark	Notes
8	$2(3 + 2y)^2 + y^2 = 6$ or $2x^2 + \left(\dfrac{x-3}{2}\right)^2 = 6$			M1 for correct substitution for x or y
	e.g. $2(9 + 12y + 4y^2) + y^2 = 6$ or $2x^2 + \dfrac{x^2 - 6x + 9}{4} = 6$			M1 for correct expansion in correct equation
	e.g. $9y^2 + 24y + 12 (= 0)$ or $9x^2 - 6x - 15 (=0)$			M1 for correct 3 term quadratic dep on M1(one of the 2 above)
	$(3y + 2)(y + 2) (=0)$ $(3x - 5)(x + 1) (=0)$			M1 Solving 3 term quadratic .For correct factorising or correct use of formula or completing the square.
		$x = \dfrac{5}{3}, y = -\dfrac{2}{3}$ $x = -1, y = -2$		A1 for correct x or y values
			6	A1 for all 4 values correctly paired

Question	Working	Answer	Mark	Notes
9	eg (3×5+2×15+3.6×10+0.6×20+1.7×10) **or** (6×5+4×15+7.2×10+1.2×20+3.4×10) or (30×5+20×15+36×10+6×20+17×10) (3×5+2×15+3.6×10+0.6×20+1.7×10) [= 110] **or** (6×5+4×15+7.2×10+1.2×20+3.4×10) [=220] or (30×5+20×15+36×10+6×20+17×10) [=1100] freq of 30 – 50 bar = 20 × 2.4 [=48] or freq of 50 – 60 bar = 10 × 6.8[=68] or freq of 45 – 50 = 5 × 2.4[=12] $\dfrac{"80"}{440} \times \dfrac{"80"-1}{439}$	 0.0327	 5	M1 for use of area of bar, showing at least 2 products or for statement such as 44 blocks of 25 squares or 11 blocks of 100 squares. Allow 44 squares. Implied by following Method mark M1 for complete method to find total area of bars **or** for >45 = $\dfrac{8}{44}$ or $\dfrac{2}{11}$ **or** for FD scale of 1cm = FD of 2 , 0.4 [per small square] oe M1 for correct method to find frequency of 30-50 **or** 50-60 bar **or** 45 – 50 **or** for $\dfrac{8}{44} \times 440$ or $\dfrac{2}{11} \times 440$ oe M1 oe A1 0.032718989..., $\dfrac{158}{4829}$ awrt 0.0327

Question	Working	Answer	Mark	Notes
10 (a)	$8x^2 + 8xy = 240$	$8x^2 + 8xy = 240$ $x^2 + xy = 30$ $x^2 + xy - 30 = 0$	2	M1 A1 cso Completely correct rearrangement
(b)	(volume =) $4x^2y$ $y = \dfrac{30 - x^2}{x}$ (volume =) $4x^2 \times (\dfrac{30 - x^2}{x}) = 120x - 4x^3$ $\dfrac{dy}{dx} = 120 - 12x^2 = 0$	$\sqrt{10}$	5	M1 Correct volume M1 Finding y in terms of x allow 1 sign error M1 Subst y into Volume M1 Multiplying out and Differentiating one term correct A1 Must be exact