Mark Scheme 2343
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1	(a)	$2n + 3$ or equivalent	**W2**	**M1** $2n$
	(b)	$16x - 13$	**W2**	**W1** $16x$ or -13 or $16x + -13$ **W1** $6x +2 +10x -15$ (3 terms)
	(c)	$(x - 5)(x - 2)$	**W2**	isw **W1** $(x\pm5)(x\pm2)$ **M1** $x - 5$ and $x - 2$ shown in grid or without brackets
2	(a)	3 5/6	**W3**	**W2** $\underline{15} + \underline{8}$ or $\underline{23}$ or $3 + \underline{3} + \underline{2}$ $\quad$ 6 $\quad$ 6 $\quad$ 6 $\quad\quad$ 6 $\quad$ 6 $\quad$ or equivalent **M1** $\underline{a + b}$ $\quad$ or equivalent $\quad\quad$ 6 $\quad$ with either a or b correct. **ALT W3** 3.83 $\quad$ **W2** 3.83… $\quad$ **W1** 2.5 and 1.33…
	(b)	$\underline{1}$ 7	**W1**	condone 0.142857 on answer line
	(c)	$\underline{8}$ isw 33	**W2**	**M1** $100r = 24.24…$ or **W1** $\underline{24}$ or equivalent $\quad$ 99
3		200000 or equivalent (any) isw (accept 207500 or 207000)	**W3**	**M1** 8/4 or 8.28/4 or 8.3/4 or 2 $\quad$ or 8000/0.04 or evidence $\quad$ digits 8/4 **And** **M1** 100000 or equivalent (eg 10^5)
4	(a)	-1, 0, 1, 2, 3, 4	**W3**	**W2** for 5 or 6 correct and 1 extra or 1 omission **W1** for 4 correct and 1 extra $\quad$ or –3,0,3,6,9,12 (all) **Or** **M1** for $\underline{-5} < n \leq 4$ $\qquad\qquad$ 3
	(b)	Multiplication of equation 2 by 2 Then Addition of eqn 1 and eqn 2 **Or** Multiplication of equation 1 by 2 & Multiplication of equation 2 by 3 Then subtraction of eqn 2 from eqn1 $x = 5$ and $y = -2$	**M1** **M1** **A1**	 Condone 1 error Condone 1 error **M1** Condone 1 error **M1** Condone 1 error **Or M1** $3x - 2(8\pm2x) =19$ and $\quad$ **M1** $3x - 16 + 4x =19$ condone $\qquad\qquad$ 1 error (ft) Answer only **W1**

5	(a)	$x \times x \times (x+3)$	W2	**M1** for **use** of v = lbh eg $xx\ xx\ x +3$ or $x^2 \times x + 3$
	(b)	112	W1	
	(c)	4 points plotted to within 1 graph square	P1	Points within 1 square
		Smooth curve through 4 points	C1	Not ruled Curve through their points within 1 square.
	(d)	2.25 to 2.4	W1	No ft
6	(a)	$(x =) \dfrac{y+3}{5}$ or $\dfrac{y}{5} + \dfrac{3}{5}$ or $(y+3) \div 5$	W2	**M1** $5x = y +3$ or $y = x - \dfrac{3}{5}$ **or W1** $(x=) \dfrac{\pm y \pm 3}{\pm 5}$ or **W1** $y+3 \div 5$ or $y+3/5$ or $3+y/5$
	(b)	$(d =) \dfrac{8c}{c-2}$ or $\dfrac{-8c}{2-c}$	W4	**M1** $cd - 3c\ (= 2d +5c)$ **And** **M1** $cd - 2d = 3c +5c$ ft their 1st step (subtract 2d, add 3c allow 1 error if method clear) **And** **M1** $d(c-2) = 3c +5c$ ft their 2nd step If M0 scored award **W1** for $cd - 3c = 2d +5c$ seen
7		<BCA or < BCA = 63 Triangle ABC **isosceles** because **tangents (**from a point to a circle are equal.)	W1 W1	
		<BCA = < ADC alternate segment <ADC = 63	W1 1	or equivalent from **no** incorrect assumptions ft their <BCA
8		$\dfrac{1}{9}$ or equivalent decimal (0.111)	W2	**M1** 9 or $\dfrac{1}{3}$ or $\dfrac{1}{729}$ or $\dfrac{1}{3^2}$ condone -9 nww **or W1** $\dfrac{-1}{9}$
9	(a)	130 230	W1 W1	Ft 360 – their obtuse 130 (mark worst 2)
	(b)	Graph	W2	One complete cycle (0,1) to (120, 1) condone errors after 120. **W1** Graph through (0,1) and attempt to use horizontal stretch. Or graph with period 120, amplitude 3

| 10 | $4x^2 - 2x - 30 = 0$
or $2x^2 - x - 15 = 0$ | W4 | **M1** $2(4x\text{-}5) + 5(x\text{+}4)= (x\text{+}4)(4x\text{-}5)$
    may be later
And
W1 $8x - 10 + 5x + 20$
W1 $4x^2 + 16x - 5x - 20$
   condone 1 error
And
W1 $4x^2 - 2x - 30 = 0$
      ft their 2nd step involving
quadratic, dependent on M1 scored |
| | 3 and –2.5 (-5/2) | W3 | **And then**
M2 $(2x\text{+}5)(x\text{-}3)$ or $(4x\text{+}10)(x\text{-}3)$
   $(2x\text{+}5)(2x\text{-}6)$ ft their 3rd step
Or M1 $(2x\pm5)(x\pm3)$ ft their 3rd step
Alt M2 $\dfrac{1\pm 11}{4}$ or $\dfrac{2\pm 22}{8}$
  Or M1 $\dfrac{1\pm \sqrt{(1+8\times15)}}{4}$ or
     $\dfrac{2\pm \sqrt{(4 + 16\times30)}}{8}$
   condone 1 error
A1 3 and –2.5 |

Section B

11 (a)	12.5%	**W3**	**M2** 1.125 or 112.5 or 0.125 **M1** 202500/180000 or 22500/180000
(b)	202500×1.125^8	**M1**	or Ft their (a) Condone either value $\times 1.125^9$ or $\times 1.125^8$ Or clear intent for 8/9 years with first 3 evaluated.
	519571	**W1**	Condone 519500 to 519600

12 (a)	28.5	**W4**	**W3** 23.5 or 33.5
			(**SC3** for 29 if 15.5 etc seen and used, or 28 if 14.5 etc seen and used)
			M3 for $\frac{\sum ft}{\sum f}$ (their $\sum f$ if shown)
			with 4 of 15/25/35/45/55 used for t
			Or W2 for 1710 seen or $\sum ft$ with 4 midpoints used.
			Or M2 for $\frac{\sum ft}{\sum f}$ with t in range
			    $10 \leq t \leq 20$ etc (may be inconsistent)
			Or M1 for $\frac{\sum ft}{\sum f}$ with t in range
			    $10 \leq t \leq 20$ etc
			(may be inconsistent)
			Or W1 for 4 of 15/25/35/45/55 seen or used.

(b) (i)	27 to 28	**W1**	
(ii)	12 or 13	**W2**	**W1** for 47 to 48 (or 12 **to** 13)
13 (a)	3.69 to 3.71	**W3**	**M2** h = $\frac{186}{\pi \times 4^2}$ (evidenced by 3.72) **or M1** $\pi \times 4^2 \times h = 186$ **Or If M0, W1** 50.2 to 50.3
(b)	3999	**W2**	**M1** 186 ×21.5 **A1 or W1** 4000

14 (a)	13.8 or 14 (not 13.80)	**W4**	**W3** for 13.7 to 13.9 **M2** for $\sqrt{6.25^2 + 12.3^2}$ **Or M1** $6.25^2 + 12.3^2$ **A1** 13.7 to 13.9 After A0 allow **W1** for any answer to 2 or 3 significant figures after Pythagoras/Trig used. (10.6 or 11 from Pythag sub'n) **ALT** **M1** <DAB =$\tan^{-1}$(12.3/6.25) or 63.06 Or <ADB = 26.94 Then **M1** AD = 12.3/sin 63 or 12.3/cos26.9	
(b)	14.6 to 14.7	**W3**	**M2** 12.3 ÷ sin 57 **Or M1** for sin 57 =12.3 ÷ CD or CD sin57 = 12.3 **ALT M1** BC = 12.3/tan57 **and M1** CD=$\sqrt{12.3^2+\text{their BC}^2}$ **W2** grad 15.7 to 15.8 or rad 28.2 to 28.3	
15 (a)	Circle radius 4 centre (0,0)	**W2**	**W1** for freehand circle in 3 sectors to include intersection with axes or circle drawn with compasses using centre (0,0) and any radius.	
(b)	x + y = 2 drawn	**W1**	Ruled, cutting axes	
	x = 3.6 to 3.7 y = -1.6 to -1.7 x = -1.6 to –1.7 y = 3.6 to 3.7	**W1** **W1**	or Ft from their attempt at circle and correct line	
16 (a)	210 500 (499)to 216 500 and 209 500 to 217 500 (499)	**W1** **W1**	**M1** two values from the 4	
	6000 or 6001 8000 or 7999	**A1**		
(b)	66	**W2**	**M1** $\underline{29}$ or .13… or equivalent 217 **A1 or W1** for 67 or 68	
17 (a)	$(x - 7)^2 +11$	**W3**	**M1** $(x - 7)^2$ **And M1** 60 – their $(-7)^2$	
(b)	11	**W1**	ft their (a)	

18 (a)	0.064 or equivalent isw	**W2**	**M1** 0.4×0.4×0.4
(b)	0.352	**W3**	**M2** 0.288 or 0.4²×0.6×3 or 0.4²×0.6×2 +0.4³ or 0.256 **Or M1** 0.4²×0.6 Award 2 in (b) for consistent use of 0.6 instead of 0.4 and vv. (Also 0.3 instead of 0.4 if clear) If M0, **W1** for indication of 4 winning ways. **SC2** 0.648

19 (a)	e.g. sinBOC =1.2/2.5
	      BOC = 28.7 or 28.6
	      BOA = 180 –2×28.7
		M1
		 M1
		 A1
			Can be implied by 28.7
			 Verification method
			 scores 1 or 2.

(b)	46.4 to 46.8	**W4**	**M2** AB=<u>123</u>× π × 5
			               360
			 Or M1 AB=<u>123</u>× π × 2.5
			                 360
			 Or M1 π × 5 or 15.7
			 And
			 M1 their AB × 6 + 1.2 × 6 (× 2)
			 (Their AB must use π)