Gold Level

Mark Scheme 1

Level	IGCSE
Subject	Maths
Exam Board	Edexcel
Difficulty Level	Gold
Booklet	Mark Scheme 1

Time Allowed: **60 minutes**

Score: **/50**

Percentage: **/100**

Grade Boundaries:

9	8	7	6	5	4	3	2	1
>85%	75%	65%	55%	45%	35%	25%	15%	<15%

Question Number	Working	Answer	Mark	Notes
1.	1.75 seen		2	M1
		8		A1
				Total 2 marks

Question Number	Working	Answer	Mark	Notes
2. (a)(i)		114	2	B1 cao
(ii)	eg angle at the centre = 2 × angle at circumference			B1 Three key points must be mentioned 1. Angle at centre/middle/*O*/origin 2. Twice, double, 2× or half/ $\frac{1}{2}$ as appropriate 3. angle at circumference/edge/perimeter (NOT e.g. angle *D*, angle *ADB*, angle at top, angle at outside)
(b)		74	1	B1 cao
				Total 3 marks

Question Number	Working	Answer	Mark	Notes
3. (a)	$P = kQ^3$		3	M1 for $P = kQ^3$ but not for $P = Q^3$
	$1350 = k \times 3375$			M1 for $1350 = k \times 3375$ Also award for $1350 = k \times 15^3$
		$P = 0.4Q^3$ oe		A1 $P = 0.4Q^3$ oe Award 3 marks if answer is $P = kQ^3$ oe but k is evaluated as 0.4 in part (a) or part (b)
(b)		3200	1	B1 ft from "0.4" × 8000 except for k = 1, if at least M1 scored in (a) (at least 1 d.p. accuracy in follow through)
				Total 4 marks

Question Number	Working	Answer	Mark	Notes	
4.	$a^2 \times 10^{2n}$		3	M1	
		$\frac{a^2}{10} \times 10^{2n+1}$		A1 for $\frac{a^2}{10}$ oe A1 for $\times 10^{2n+1}$ oe	Award M1 A1 A1 for $\frac{a^2}{10} \times 10^{2n+1}$ even if M1 not awarded. Award M1 A1 A0 if $\frac{a^2}{10}$ oe seen. Award M1 A0 A1 if $\times 10^{2n+1}$ oe seen.
					Total 3 marks

Question Number	Working	Answer	Mark	Notes
5. (a)	Use of areas to obtain a correct expression for A, which must be correctly punctuated. For example $(A =) 80 - 2\times\frac{1}{2}x(10-x) - 2\times\frac{1}{2}x(8-x)$ or $10\times 8 - \frac{1}{2}x(10-x) - \frac{1}{2}x(10-x) - \frac{1}{2}x(8-x) - \frac{1}{2}x(8-x)$ or $80 - x(10-x) - x(8-x)$ or $80 - 2\left(\frac{10x-x^2}{2}\right) - 2\left(\frac{8x-x^2}{2}\right)$		3	B2 B1 for expression for area of triangle or pair of congruent triangles, for example $\frac{1}{2}x(10-x)$ or $\frac{1}{2}x(8-x)$ or $x(10-x)$ or $x(8-x)$ Condone omission of brackets for award of B1
	Correct simplification of a correct expression for A to obtain an expression which is equivalent to $2x^2 - 18x + 80$ For example $(A =)\ 80 - 10x + x^2 - 8x + x^2$ or $80 - (10x - x^2) - (8x - x^2)$ or $80 - (5x - \frac{1}{2}x^2) - (5x - \frac{1}{2}x^2) - (4x - \frac{1}{2}x^2) - (4x - \frac{1}{2}x^2)$			B1 dep on B2
(b)(i)		$4x - 18$	5	B2 B1 for 2 of 3 terms differentiated correctly
(ii)	"$4x - 18$" = 0			M1
		4.5 oe		A1 cao
(iii)	eg positive coefficient of x^2 or U shape or $\frac{d^2A}{dx^2} = 4$ which > 0			B1
				Total 8 marks

Question Number	Working	Answer	Mark	Notes
6.	$x^2 + (2x-3)^2 = 2$		6	M1 for correct substitution
	$x^2 + 4x^2 - 6x - 6x + 9 = 2$ or $x^2 + 4x^2 - 12x + 9 = 2$			B1 (indep) for correct expansion of $(2x-3)^2$ even if unsimplified
	$5x^2 - 12x + 7 (= 0)$			B1 for correct simplification Condone omission of '= 0'
	$(5x-7)(x-1)(=0)$ or $\frac{12 \pm \sqrt{4}}{10}$ or $\frac{12}{10} \pm \frac{\sqrt{4}}{10}$ or $\frac{6}{5} \pm \frac{1}{5}$			B1 for correct factorisation or for correct substitution into quadratic formula and correct evaluation of '$b^2 - 4ac$' or for using square completion correctly as far as indicated
	$x = 1$ or $x = 1\frac{2}{5}$			A1 for both values of x dep on all preceding marks
		$x = 1,\ y = -1$ $x = 1\frac{2}{5},\ y = -\frac{1}{5}$		A1 for complete, correct solutions (need not be paired) dep on all preceding marks No marks for $x = 1,\ y = -1$ with no working
				Total 6 marks

Question Number	Working	Answer	Mark	Notes
7.	$\frac{2\pi r^2 + 2\pi rh}{4\pi r^2} = 2$		5	M1 Also award for $\frac{\pi r^2 + 2\pi rh}{4\pi r^2} = 2$
	$2\pi r^2 + 2\pi rh = 2 \times 4\pi r^2$ oe			M1 for $2\pi r^2 + 2\pi rh = 2 \times 4\pi r^2$ oe or $\frac{2\pi r(r+h)}{4\pi r^2} = 2$ If first M1 awarded for $\frac{\pi r^2 + 2\pi rh}{4\pi r^2} = 2$ award this second M1 also for $\pi r^2 + 2\pi rh = 2 \times 4\pi r^2$ oe
	$h = 3r$ oe			A1 If first M1 awarded for $\frac{\pi r^2 + 2\pi rh}{4\pi r^2} = 2$ and second M1 for $\pi r^2 + 2\pi rh = 2 \times 4\pi r^2$ oe Award this A1 also for $h = 3.5r$ oe
	$\frac{\pi r^2 \times "3r"}{\frac{4}{3}\pi r^3}$ oe			M1 dep on first two M1s h must be of the form kr
		$\frac{9}{4}$ oe		A1
				Total 5 marks

8. (i)		120 ,100	2	M1 1 square = 10 people or any correct fd value seen in correct place with no errors A1 both values correct
(ii)		Blocks at 5, 1, 2 squares	2	B1B1 for all 3 correct blocks, B1B0 for 1 or 2 correct blocks.
				Total 4 marks

9. (a)		$\frac{7}{8}$ for not late Correct binary structure ALL labels and values correct	3	B1 on lower first branch B1 4 branches needed on RHS B1
(b)	(1/8) x "(7/8)" or "(7/8)" x (1/8) or (1/8) x (1/8) (1/8) x "(7/8)" + "(7/8)" x (1/8) +(1/8) x (1/8)	$\frac{15}{64}$	3	M1 ft Any 1 "correct" product M1 ft 3 "correct" products with intention to add. Only ft probabilities < 1 or M2 for 1 –" $(\frac{7}{8})^2$ " A1 cao (0.234375)
				Total 6 marks

10.	x = 0.396396… 1000x = 396.396.... 999x = 396	$\frac{44}{111}$	2	M1 A1 must reach $\frac{396}{999}$ or equivalent fraction (but not $\frac{44}{111}$)
				Total 2 marks

11 .(a)		*(x*=)0	1	B1 Accept (x)≠0	
(b)	$(\frac{2}{a}+1\ ) / \frac{2}{a} = 3$ $\frac{2}{a} + 1 = \frac{6}{a}$ or $1 + \frac{a}{2} = 3$ oe	4	3	M1 (Any letter in place of *a* acceptable) Solve g(x)=3 (x=0.5) M1 Solve f(a)=0.5 A1 dep on M2	
(c)	$y = \frac{x+1}{x}$ $x\,(y-1) = 1$ $x = \frac{1}{y-1}$	$\frac{1}{x-1}$	3	M1 M1 one occurrence of *x* A1 reverse labels *x* and *y*	$x = \frac{y+1}{y}$ reverse labels *x* and *y* $y\,(x-1) = 1$ one occurrence of y
					Total 7 marks