The Bridge to A level

Diagnosis Mark Scheme

Section	Question	Answer	Marks	Notes
1	1	-2, -4	M1 A1	(x ± 2)(x ± 4)
	2	y = 3 or y = 4 cao x = $\pm\sqrt{3}$ or x = ± 2 cao	M1 A1 B2	For (y-3)(y+4) oe eg use of quad form y = 3 or y = 4 cao B1 for two roots correct or ft 'their' y B2 for cao
	3(i)	$(x-3)^2 - 7$	B1 M1A1	$(x-3)^2$ -7
	3(ii)	(3,-7)	B1	ft from part (i)
2	1	$v = \sqrt{\frac{2E}{m}}$ cao www	B3	Award M1 for a correct first constructive step, M2 for $v^2 = \frac{2E}{m}$ oe
	2	$r = \sqrt[3]{\frac{3V}{4\Pi}}$	B3	Award M2 for $r^3 = \frac{3V}{4\Pi}$, M1 for cube root of 'their' r^3
	3	$C = \frac{4P}{1-P}$ oe	M1 M1 M1 A1	PC + 4P = C 4P = C – PC 4P = C(1 – P)
3	1	(0.3,1.9)	M1 A1A1	for substitution or for rearrangement one mark each coordinate
	2	$(\frac{10}{3},\frac{5}{3})$	M1 A1A1	for substitution or for rearrangement one mark each coordinate Note: award B2 if roiunded to 1dp or worse
	3	$(\frac{2}{5},\frac{11}{5})$ or (-1,-2) or answer given as x=, y=	M1 M1 A1A1	substituting linear into non-linear forming quadratic in x one mark for each set of solutions
4	1(i)	7	M1 A1	9-2
	1(ii)	$\frac{5}{7} + \frac{4}{7}\sqrt{2}$	M1 M1 A1	multiplying top and bottom by $3 + \sqrt{2}$ $\frac{3+2+3\sqrt{2}+\sqrt{2}}{7}$ if one (or none) error only
	2(i)	$30\sqrt{2}$	M1 A1	for $\sqrt{8} = 2\sqrt{2}$ or $\sqrt{50} = 5\sqrt{2}$
	2(ii)	$\frac{1}{11} + \frac{2}{11}\sqrt{3}$	M1 M1 A1	multiplying top and bottom by $6 + \sqrt{3}$ denominator = 11 (or 33)

5	1(i)	1	B1	
	1(ii)	a^8	B1	
	1(iii)	$\frac{1}{3a^3b}$	B1 B1 B1	3b a^3 inverse
	2(i)	±5	M1 A1	for $\sqrt{25}$ or $\frac{1}{5}$ seen
	2(ii)	$8x^{10}y^{13}z^4$ (or $2^3x^{10}y^{13}z^4$)	B3	B2 for 3 elements correct B1 for 2 elements correct
6	1(i)	Grad AB = 1 Grad BC = -1 product of gradients = -1 hence perp	M1 M1 C1	
	1(ii)	10	M1 A1	Use of pythagoras
	2	y = -4x + 19 cao Midpoint (4,3) verifying on line x + 2y = 10	M1 M1 A1 B1 C1	calculating m using (y -7) = m(x-3)
7	1	Cubic the correct way up -1, 2 and 5 indicated on x-axis 10 indicated on y-axis	G1 G1 G1	
	2	Negative quadratic curve Intercept (0,9) Through (3,0) and (-3,0)	G1 G1 G1	
	3	Any correct y value calculated (0,5), (1,1), (2,-1), (3,-1), (4,1) and (5,5) calculated Above points plotted Smooth parabola through the points	B1 B1 G1 G1	
8	1	$y = (x - 2)^2 - 4$	B2	M1 if y omitted, or for $y = (x + 2)^2 - 4$
	2(i)	Translation of $\binom{2}{0}$	B1 B1	
	2(ii)	y = f(x – 2)	B2	B1 for y = f(x + 2)
	3(i)	Translation of $\binom{-4}{0}$	B1 B1	
	3(ii)	sketch of parabola right way up min at (0,-4) and graph through (-2,0) and (2,0)	B1 B1	

9	1(i)	15.5	M1 A1	Use of Pythagoras
	1(ii)	x = 75.5°	M1 A1	(cos x = $\frac{4}{16}$) correct ratio and substitution
	2	√8 or 2√2 (but not ± √8)	M1 M1 A1	Use iof pythagoras use of tan Θ = opp / adj
	3	Smooth curve between y = 1 and y = -1 (90,0) and (270,0) (0,1), (180,-1), (360,1)	G1 G1 G1	
10	1(i)	9.0 or 8.96 or 8.960	M1 M1 A1	for use of cosine rule for square-rooting 'their' 80.2(8)
	1(ii)	13.3 or better (13.2577..)	M1 A1 A1	use of 'their' 0.5 x 4.1 x 6.6 x sin 108 correct values ans
	2	BC = 384 (or better) Total length = 1034m (or better)	M1 M1 A1 A1	recognisable attempt at cosine rule $BC^2 = 348^2 + 302^2 - 2x348x302xcos72$ BC = 383.86….. Total length = BC + 650 ft