

PiXL Practice Paper, June 2018, 3H, Edexcel Style Mark Scheme

Qn	Working	Answer	Mark	Notes
1	(a) $9.3^2 + \sqrt{98.05} = 96.39202$ $96.39202 \div 0.253$ (b)	380.9961265 380	2 1	M1 for 96.39202 seen A1 cao B1 cao
2	$\cos x = \frac{12}{17}$ $\cos^{-1} \frac{12}{17} = x$	$x = 45^\circ$	3	M1 for $\cos x = 12 \div 17$ M1 for $\cos^{-1} 12 \div 17$ A1 cao
3	$2\pi 28^2 + (\pi \times 56 \times 130)$ $1568\pi + 7280\pi = 8848\pi$ $8848\pi \div 2 = 4424\pi$ $56 \times 130 = 7280$ $4424\pi + 7280 =$ $21178.4059 \dots$	21178.4 cm ²	4	P1 for process to find surface area of cylinder P1 for halving their surface area of cylinder P1 for area of top rectangle A1 cao
4	$\frac{5(4.7 \times 10^3) + (7.6 \times 10^3)^2}{2 \times 4.7 \times 10^3}$ $\frac{57783500}{9400}$ 6147.1808...	6.15×10^3	3	M1 correct substitution M1 for 57783500 or 9400 seen A1 cao
5	$p(n + a) = n^2 + a$ $pa - a = n^2 - pn$ $a(p - 1) = n^2 - pn$	$a = \frac{n^2 - pn}{p - 1}$	4	M1 for $p(n + a) = n^2 + a$ M1 for expanding brackets M1 for final step to make a subject. A1 cao
6	$x = 0.34\dot{7}$ $100x = 34.\dot{7}$ $1000x = 347.\dot{7}$ $900x = 313$ $x = \frac{313}{900}$	$\frac{313}{900}$	3	M1 for $100x = 34.\dot{7}$ M1 for $1000x = 347.\dot{7}$ A1 cao

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7	$x^2 + 4x + 4 - 36 = x^2 + 4x - 32$	shown	3	P1 for $x^2 + 4x + 4 - 32$ M1 for $x^2 + 4x - 32$ A1 cao
8 (a)	$\tan x = \frac{AB}{2r}; AB = 2r \tan x$	$AB = 2r \tan x$	2	M1 for using tan ratio A1 cao
(b)	$\frac{2r \tan x \times 2r}{2} = \frac{\pi r^2}{2}$	$\tan x = \frac{\pi}{4}$	3	M1 for area of triangle and area of semi-circle M1 for equating areas and simplifying A1 cao
(c)	$\tan^{-1} \frac{\pi}{4} = x$	38.1°	2	M1 for $\tan^{-1} \frac{\pi}{4}$ A1 cao
9	$\sin 35 = \frac{5}{OE}$ $OE = \frac{5}{\sin 35}$ $OE = 8.717233978$ $C = \pi \times (8.717 \dots \times 2)$ $C = 54.77199645$	54.8 cm	4	P1 for starting process to find OE M1 for 8.7172 ... or 17.4344 ... seen M1 for $\pi \times 17.4344 \dots$ A1 cao
10	LSF $2 \frac{1}{16} \div 1 \frac{7}{8} = \frac{11}{10}$ VSF $\frac{11^3}{10^3} = \frac{1331}{1000}$ $302.5 \div \frac{1331}{1000} = 227.2727$	227g	3	M1 for LSF ie. $\frac{11}{10}$ seen M1 for VSF ie. $\frac{1331}{1000}$ seen A1 cao
11	UB 3.25 LB 3.15 $5 \times 3.25^2 + 4 = 56.8125$ $5 \times 3.15^2 + 4 = 53.6125$ $53.6125 \leq 5x^2 + 4 < 56.8125$	$53.6125 \leq 5x^2 + 4 < 56.8125$	3	P1 for upper or lower bound of 3.25 or 3.15 M1 for 56.8125 or 53.6125 seen A1 cao

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12	$v^2 = (4\sqrt{3})^2 + 2 \times \sqrt{2} \times 7\sqrt{2}$ $v^2 = 48 + 28 ; v^2 = 76$ $v = 2\sqrt{19}$	$v = 2\sqrt{19}$	4	P1 for substituting values into speed equation correctly P1 for 48 or 28 seen P1 for $\sqrt{76}$ seen A1 cao
13	$x^3 = 96 \div 12$ $x^3 = 8 \quad x = \sqrt[3]{8} \quad x = 2$ After 8 days: 12×2^8	3072g	4	M1 for $12 \times x^3 = 96$ M1 for $x = 2$ M1 for 12×2^8 A1 cao
14	(a)(i) (ii) (b)	8 cm Tangents from the same point are equal 67.2°	1 1 4	B1 cao C1 correct reason M1 for correct lengths of each side of the triangle ie. 17, 19 and 20 M1 correct substitution into cosine formula M1 for $\cos x = 250/646$ A1 cao
15	(a) $(2x + 2)(x - 2) - \left(\frac{3 \times 2}{2} \times 2\right)$ (b) $2x^2 - 2x - 10 = 10$ $x^2 = x + 10$ (c) $x_1 = \sqrt{3 + 10} = 3.605 \dots$ $x_2 = \sqrt{3.605 \dots + 10} = 3.68 \dots$ $x_3 = \sqrt{3.68 \dots + 10} = 3.69 \dots$	$2x^2 - 2x - 10$ $x = \sqrt{x + 10}$ 3.7	3 2 2	M1 for finding area of rectangle and area of triangles M1 subtracting area of triangles from rectangle A1 cao M1 for equating their expression to 10cm^2 and rearranging A1 cao M1 for using iterative process A1 cao

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16 (a)	$4(x^2 - 2x + 6.25)$ $4[(x - 1)^2 - 1^2 + 6.25]$ $4(x - 1)^2 + 21$	$4(x - 1)^2 + 21$	4	M1 for factorising by 4 M1 for $(x - 1)^2 - 1^2 + 6.25$ seen M1 for $4(x - 1)^2$ or 21 seen A1 cao
(b)		(1, 21)	1	B1 cao
(c)		Minimum value of y is 21, therefore always above 0. Will never cross the x-axis.	1	C1 correct explanation
17	$g = \frac{-12 - -2}{5 - -1} = \frac{-10}{6} = \frac{-5}{3}$ gradient of tangent = $\frac{3}{5}$ $y = \frac{3}{5}x + c$ $-12 = \frac{3}{5} \times 5 + c$ $c = -15$	$y = \frac{3}{5}x - 15$	5	P1 for starting process to find gradient from (-1,-2) to (5, -12) M1 for perpendicular gradient M1 for substitution into $y = mx + c$ M1 for -15 seen A1 cao
18	QRC = ASQ = 90° CQR = QAS AQS = QCR Same angles, so similar triangles	Similarity proved	3	M1 for correct statement with correct reason M1 for a second correct statement with correct reason C1 for complete proof justifying similarity

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19	$l = \sqrt{x^2 + h^2}$ $\pi x^2 + \pi x \sqrt{x^2 + h^2} = \pi x^2 + 2\pi x^2$ $\pi x \sqrt{x^2 + h^2} = 2\pi x^2$ $\sqrt{x^2 + h^2} = 2x$ $\rightarrow x^2 + h^2 = 4x^2$ $h = \sqrt{3}x$	$h = \sqrt{3}x$	5	P1 for starting process to find slant of cone l M1 for starting process to find surface area of hemisphere M1 for equating the two equations and begin to simplify M1 for $x^2 + h^2 = 4x^2$ seen A1 cao

TOTAL FOR PAPER IS 80 MARKS