

**N levels Practice Paper 2 2017 Answers (with Marking Scheme)**

Question Number	Question Part	Detailed Steps	Marks
1	(a)	$1.4 \times 10^9$	B1
1	(b)	$\frac{1.4 \times 10^9}{9.56 \times 10^6}$ $= 146.4435\dots$ $\approx 146 \text{ (correct to 3 significant figures)}$	M1 – Correct division A1
2	(a)	Time taken = $\frac{x}{45}$ h	B1
2	(b)	$\frac{x}{45} + \frac{160-x}{50} + \frac{40}{60} = 4$ $\frac{20(x) + 18(160-x) + 15(40)}{900} = \frac{3600}{900}$ $20x + 2880 - 18x + 600 = 3600$ $2x = 120$ $x = 60$	M1 – Equation Formed M1 – Common denominator A1
2	(c)	$160 - 60 = 100$ km	B1
3	(a)	$2x - 5 \leq 4\frac{1}{2}$ $2x \leq 9\frac{1}{2}$ $x \leq 4\frac{3}{4}$ <p>Hence, the largest possible integer <math>x = 4</math></p>	M1 – Inequality solved A1
3	(b)	$\frac{5x+10}{2x+1} \div \frac{x+2}{2x^2-5x-3}$ $= \frac{5(x+2)}{(2x+1)} \times \frac{(2x+1)(x-3)}{(x+2)}$ $= 5(x-3)$	M1 – Factorise correctly A1
4	(a)	$\frac{(\sqrt{x})^3 \times 2x^2}{2x^0}$ $= \frac{x^{\frac{3}{2}} \times 2x^2}{2}$ $= x^{\frac{7}{2}}$	M1 – Apply law of indices correctly A1

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4	(b)	$\frac{b}{2} = \frac{3b + ac}{a}$ $ab = 6b + 2ac$ $ab - 2ac = 6b$ $a(b - 2c) = 6b$ $a = \frac{6b}{b - 2c}$	M1 – Cross-multiply  M1 – Factorise A1
4	(c)	$6x - y - 5 = 0 \text{ ----- (1)}$ $8x + 3y = -5 \text{ ----- (2)}$ $\text{From (1): } y = 5 - 6x \text{ ----- (3)}$ $\text{Substitute (3) into (2):}$ $8x + 3(5 - 6x) = -5$ $8x + 15 - 18x = -5$ $-10x = -20$ $x = 2$ $y = 5 - 6(2)$ $y = -7$	M1 – Correct Method of Solving  A1  A1
5	(a)	$\frac{1}{2}(10)^2\theta = 61$ $50\theta = 61$ $\theta = 1.22 \text{ radian}$	M1 – apply $\frac{1}{2}r^2\theta = \text{Area}$  A1
5	(b)	Major arc length $AB$ $= 10(2\pi - 1.22)$ $= 50.6 \text{ cm (correct to 3 significant figures)}$	M1 – apply $r\theta$ A1
5	(c)	$\tan 1.22 = \frac{AT}{10}$ $AT = 10 \tan 1.22$ $AT = 27.3 \text{ cm (correct to 3 significant figures)}$	M1 – Trigo Ratio  A1
5	(d)	Area of shaded region $= \frac{1}{2}(10)(10 \tan 1.22) - 61$ $= 75.6 \text{ cm}^2 \text{ (correct to 3 significant figures)}$	M1 – Area of triangle – sector A1
6	(a)	Total Surface Area of Sphere $= 4\pi(12)^2$ $= 576\pi$ $= 1810 \text{ cm}^2 \text{ (correct to 3 significant figures)}$	M1 – apply $4\pi r^2$ A1

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6	(b)	Volume of Sphere $= \frac{4}{3}\pi(12)^3$ $= 2304\pi$ $= 7240 \text{ cm}^3$ (correct to 3 significant figures)	M1 – apply $\frac{4}{3}\pi r^3$ A1
6	(c)	Length $= \sqrt[3]{2304\pi}$ $= 19.3 \text{ cm}$ (correct to 3 significant figures)	B1
7	(a)	Amount paid in cash $= \frac{20}{100} \times \$150000$ $= \$30\,000$	B1
7	(b)	Total interest payable $= (\$150000 - \$30000) \times \frac{2.9}{100} \times 8$ $= \$27\,840$	M1 A1
7	(c)	Monthly instalment payable $= \frac{\$120000 + \$27840}{8 \times 12}$ $= \$1\,540$	M1 A1
7	(d)	Total Cost $= \$150\,000 + \$27\,840$ $= \$177\,840$	B1
8	(a)	$p = 6$ $q = -3$	B1 B1
8	(b)	Correct scale drawn on axes Correct points plotted Smooth curve passing through all the points	B1 B1 B1
8	(c)	Tangent line drawn at $x = 3$ Gradient $\approx \frac{-4 - 0}{2 - 4} = 2$	M1 A1 – method must be correct
8	(d)	Equation of line symmetry is $x = 2$	B1
9	(a)	Vertically opposite angles	B1
9	(b)	Corresponding angles	B1
9	(c)	$BD = \sqrt{8^2 + 6^2} = 10 \text{ cm}$	B1

Question Number	Question Part	Detailed Steps	Marks
9	(d)	$\frac{AD}{8} = \frac{4}{6}$ $AD = 5\frac{1}{3} \text{ cm}$	M1 A1
10	(a)(i)	$\angle BCA = 200^\circ - 90^\circ = 110^\circ$	B1
10	(a)(ii)	<p>Let the distance of House A to House B be <math>AB</math>.</p> $AB^2 = 60^2 + 48^2 - 2(60)(48)\cos 110^\circ$ $AB = 88.7357652$ $AB \approx 88.7 \text{ m (correct to 3 significant figures)}$	M1 A1
10	(a)(iii)	<p>Let the angle of elevation of House A from C be <math>\theta</math>.</p> $\tan \theta = \frac{12-8}{48}$ $\theta = 4.780 \approx 4.8^\circ \text{ (correct to 1 decimal place)}$	M1 A1
10	(b)(i)	$\angle POQ = (180^\circ - 90^\circ - 28^\circ) \times 2$ $= 124^\circ$	M1 A1
10	(b)(ii)	$\angle PWQ = 124^\circ \div 2 = 62^\circ$	B1
11	(a)(i)	<p>Mean Score</p> $= \frac{(5.5 \times 2) + (15.5 \times 8) + (25.5 \times 11) + (35.5 \times 10) + (45.5 \times 9)}{2 + 8 + 11 + 10 + 9}$ $= \frac{1180}{40}$ $= 29.5$	M1 A1
11	(a)(ii)	<p>Standard Deviation</p> $= \sqrt{\frac{40370}{40} - \left(\frac{1180}{40}\right)^2}$ $= 11.7898\dots$ $\approx 11.8 \text{ (correct to 3 significant figures)}$	M1 A1
11	(a)(iii)	Class A performed better because the mean score is higher.	B1
11	(b)(i)	<p>P(Billy takes bus and is not late)</p> $= \frac{2}{3} \times \frac{9}{10}$ $= \frac{3}{5}$	B1
11	(b)(ii)	<p>P(Billy is late)</p> $= \left(\frac{1}{3} \times \frac{2}{5}\right) + \left(\frac{2}{3} \times \frac{1}{10}\right)$ $= \frac{1}{5}$	M1 A1

Question 8

