

2009 June

1380/4H					
Question		Working	Answer	Mark	Notes
1	(a)	325×1.68	546	2	M1 for 325×1.68 seen or digits 546 A1 for 546, accept 546.00, 546.0
	(b)	$117 \div 1.5$	78	2	M1 for $117 \div 1.5$ seen or digits 78 A1 for 78, accept 78.00, 78.0
2	(a)		Correct shape	2	B2 for correct shape; any orientation. (B1 for any two sides correct or all correct for scale factor other than 1 or 2), tolerance to within half square
	(b)		Reflection in line $x = 0$	2	B1 for reflection, reflect, reflected. B1 for line $x = 0$ or y-axis NB: more than one transformation should be awarded 0 marks.
3		$1^2 + 1$ $2^2 + 1$ $3^2 + 1$	2, 5, 10	2	M1 for 1^2+1 or 2^2+1 or 3^2+1 (but not 1^2+1 , 2^2+2 , 3^2+3) A1 for 2, 5, 10 SC: B1 for 1, 2, 5 with or without working
4	(a)		(65, 100), (80, 110) plotted	1	B1 for plotting both points (65, 100), (80, 110) correctly (tolerance one square); ignore any additional plots given.
	(b)		positive (correlation)	1	B1 for positive (correlation) or length increases with height oe
	(c)		105 - 110	2	M1 for a single line segment with positive gradient that could be used as a line of best fit or a vertical line from 76 A1 for given answer in the range 105 – 110

1380/4H				
Question	Working	Answer	Mark	Notes
5	$143.64 \div 19 = 7.56$ $7.56 \times 31 =$	234.36	3	M1 for $143.64 \div 19$ (or 7.56 seen) or 143.64×31 (or 4452.84 seen) M1(dep) for '7.56' \times 31 or '4452.84' \div 19 or $143.64 + 12 \times 7.56$ A1 for 234.36 cao accept 234.36p Alternative method: M1 for $\frac{31}{19}$ (or 1.63(1...) seen) M1 (dep) '1.63...' \times 143.64 A1 for 234.36 cao accept 234.36p
6	(a) $1.8 \times -8 + 32$	17.6	2	M1 for 1.8×-8 or -14.4 or $\frac{-72}{5}$ seen or $32 - '1.8 \times 8'$ or $1.8 \times -8 + 32$ seen A1 for 17.6 or $\frac{88}{5}$ or 17.60 oe
	(b) $68 = 1.8C + 32$ $1.8C = 68 - 32$ $C = 36 \div 1.8$	20	2	M1 for $68 - 32$ or 36 or $68 = 1.8C + 32$ seen; condone replacement of C by another letter. A1 for 20 cao NB Trial and improvement score 0 or 2
7		diagram	3	M1 for line drawn or point marked within guidelines from P M1 for line drawn or point marked within guidelines from Q up to top guideline from P A1 for point indicated within region where guidelines intersect

1380/4H																																	
Question	Working	Answer	Mark	Notes																													
8	(a)	$18 \div 6 : 12 \div 6$	3 : 2	2	M1 for 18 : 12 or 12 : 18 or 1.5:1 oe or any correct ratio reversed eg 2:3 A1 for 3 : 2 or 1 : 0.6 ... [recurring]																												
	(b)	$5 + 1 = 6$ $54 \div 6 = 9$ 5×9	45	2	M1 for $\frac{5}{5+1} \times 54$ or $\frac{1}{5+1} \times 54$ or $54 \div '5+1'$ or 54×5 or 270 or 9 : 45 or 9 seen, as long as it is not associated with incorrect working. A1 for 45 cao																												
9		<table border="1"> <tbody> <tr><td>2</td><td>48</td></tr> <tr><td>3</td><td>87</td></tr> <tr><td>2.5</td><td>65.(625)</td></tr> <tr><td>2.6</td><td>69.(576)</td></tr> <tr><td>2.7</td><td>73.(683)</td></tr> <tr><td>2.65</td><td>71.6(09)</td></tr> <tr><td>2.61</td><td>69.9(79)</td></tr> <tr><td>2.62</td><td>70.3(84)</td></tr> <tr><td>2.63</td><td>70.7(91)</td></tr> <tr><td>2.64</td><td>71.1(99)</td></tr> <tr><td>2.66</td><td>72.(021)</td></tr> <tr><td>2.67</td><td>72.4(34)</td></tr> <tr><td>2.68</td><td>72.8(48)</td></tr> <tr><td>2.69</td><td>73.2(65)</td></tr> </tbody> </table>	2	48	3	87	2.5	65.(625)	2.6	69.(576)	2.7	73.(683)	2.65	71.6(09)	2.61	69.9(79)	2.62	70.3(84)	2.63	70.7(91)	2.64	71.1(99)	2.66	72.(021)	2.67	72.4(34)	2.68	72.8(48)	2.69	73.2(65)	2.6	4	B2 for trial $2.6 \leq x \leq 2.7$ evaluated (B1 for trial $2 \leq x \leq 3$ evaluated) B1 for different trial $2.6 < x \leq 2.65$ B1(dep on at least one previous B1) for 2.6 Values evaluated can be rounded or truncated, but to at least 2sf when x has 1dp and 3sf when x has 2dp NB Allow 72 for evaluation using $x = 2.66$ NB No working scores no marks even if answer is correct
2	48																																
3	87																																
2.5	65.(625)																																
2.6	69.(576)																																
2.7	73.(683)																																
2.65	71.6(09)																																
2.61	69.9(79)																																
2.62	70.3(84)																																
2.63	70.7(91)																																
2.64	71.1(99)																																
2.66	72.(021)																																
2.67	72.4(34)																																
2.68	72.8(48)																																
2.69	73.2(65)																																
10			construction	2	M1 for arcs from same centre on 2 lines at same distance from meeting point ($\pm 2\text{mm}$) A1 for bisector ($\pm 2^\circ$) and correct arcs SC: B1 for bisector ($\pm 2^\circ$) with no arcs, or incorrect arcs if M0 awarded. Accept bisectors that are dashed or dotted.																												

1380/4H				
Question	Working	Answer	Mark	Notes
11		2 + 'prime number' is odd	2	<p>M1 for a counter example showing intent to add 2 and another prime number; ignore incorrect examples A1 for a correctly evaluated counter example with no examples given that involve either non-primes or incorrect evaluation</p> <p>Alternative method B2 for fully correct explanation '2 is a prime number, odd + even (or 2) = odd' oe with no accompanying incorrect statements or examples (B1 for '2 is a prime number' or recognition that not all prime numbers are odd or odd + even (or 2) = odd; ignore incorrect examples or statements)</p>
12	$15 \times 3 = 45$ 15×3.5 $25 \times 9 = 225$ 25×9.5 $20 \times 15 = 300$ 20×15.5 $12 \times 21 = 252$ 12×21.5 $8 \times 27 = 216$ 8×27.5 $1038 \div 80 = 12.975$ $1078 \div 80 = 13.475$	12.97 - 13.48	4	<p>M1 for fx consistently within interval including ends (allow 1 error) M1 (dep) consistently using appropriate midpoints M1 (dep on first M) for $\Sigma fx \div \Sigma f$ A1 for 12.97 - 13.48 with no arithmetic errors</p>

1380/4H					
Question	Working	Answer	Mark	Notes	
13		$(0.5 \times 3.14... \times 8) + 8$	20.56 - 20.58	3	M2 for $(0.5 \times \pi \times 8)$ or $\pi \times 4$ or $(\pi \times 8 + 8)$ or $(0.5 \times \pi \times 8 + 8)$ oe (M1 for $\pi \times 8$ or $2\pi \times 4$; for a value 25.1-25.2 inclusive unless seen with incorrect working eg πr^2) A1 for 20.56 – 20.58 (SC: B2 if M0 scored for 12.56 - 12.58)
14	(a)		a^3	1	B1 for a^3 cao
	(b)	$5 \times 3x - 5 \times 2$	$15x - 10$	1	B1 for $15x - 10$ cao
	(c)	$3y \times y + 3y \times 4$	$3y^2 + 12y$	2	M1 for $3y \times y + 3y \times 4$ or $3y^2 + a$ or $3y^2 + ay$ or $b + 12y$ or $by^2 + 12y$ where a, b are integers, and can be zero A1 for $3y^2 + 12y$ or $3 \times y^2 + 12 \times y$ NB: If more than 2 terms in expansion MOA0
	(d)	$2x - 8 + 3x + 6$	$5x - 2$	2	M1 for $2 \times x - 2 \times 4$ or $2x - 8$ or $3 \times x + 3 \times 2$ or $3x + 6$ A1 for $5x - 2$ cao
	(e)	$x^2 + 4x - 3x - 12$	$x^2 + x - 12$	2	M1 for 4 terms correct with or without signs, or 3 out of no more than 4 terms, with correct signs (the terms may be in an expression or table) or $x(x - 3) + 4(x - 3)$ or $x(x + 4) - 3(x + 4)$ A1 for $x^2 + x - 12$ cao
15		$4.6 + 3.85 = 8.45$ $3.2^2 - 6.51 = 3.73$ $8.45 \div 3.73 =$	2.26541555	2	M1 for $\frac{169}{20}$ or $\frac{256}{25}$ or $\frac{373}{100}$ or 3.73 or 10.24 or 8.45 seen A1 for 2.265(41555); accept $\frac{845}{373}$

1380/4H					
Question	Working	Answer	Mark	Notes	
16	(a)	t^{6+2}	t^8	1	B1 for t^8 or for t^{6+2}
	(b)	m^{8-3}	m^5	1	B1 for m^5 or for m^{8-3}
	(c)	$2^3 \times x^3$	$8x^3$	2	B2 for $8x^3$ cao (B1 for ax^3 , $a \neq 8$ or $2x \times 2x \times 2x$ or $8x^n$ $n \neq 0,3$)
	(d)	$3 \times 4 \times a^{2+5} \times h^{1+4}$	$12a^7h^5$	2	B2 for $12a^7h^5$ (B1 for $12a^7h^n$, $n \neq 0,5$ or $12a^mh^5$, $m \neq 0,7$ or ka^7h^5 , $k \neq 12$ or $3 \times 4 \times a^{2+5} \times h^{1+4}$)
17	$9^2 - 6^2$ $81 - 36 = 45$ $\sqrt{45}$	6.705 - 6.71	3	M1 for $9^2 - 6^2$ or $81 - 36$ or 45 or $9^2 = AB^2 + 6^2$ oe M1 for $\sqrt{81 - 36}$ or $\sqrt{45}$ A1 for 6.705 - 6.71 [SC: M1 for $\sqrt{81 + 36}$ or $\sqrt{117}$]	
18	(a)		Heaviest bag is 29kg	1	B1 for 23kg is the upper quartile oe, or the heaviest bag is 29kg oe, or 25% of bags are heavier than 23kg or range is 5 - 29 oe
	(b)		17	1	B1 for 17 cao
	(c)	$23 - 10$	13	1	B1 for 13 cao
	(d)	$\frac{25}{100} \times 240$	60	2	M1 for $\frac{25}{100} \times 240$ oe or $\frac{25}{100} \times 241$ oe A1 for 60 cao (SC: B1 for 25% or 0.25 or quarter seen)

1380/4H					
Question	Working	Answer	Mark	Notes	
19	(a)	4500×1.04^2	4867.20	3	M1 for 4500×1.04 or for $4500 + 0.04 \times 4500$ or for 4680 or 180 or 360 or 4860 M1 (dep) '4680' $\times 1.04$ or for '4680' $+ 0.04 \times$ '4680' A1 for 4867.2(0) cao (If correct answer seen then ignore any extra years)
	(b)	2400×1.075^n 2580 2773.5 2981.5125 3205.12... 3445.51...	5	2	Alternative method M2 for 4500×1.04^2 or 4500×1.04^3 A1 for 4867.2(0) cao [SC: 367.2(0) seen B2] M1 for an attempt to evaluate 2400×1.075^n for at least one value of n (not equal to 1) or $3445.51 \div 1.075^n$ ($n \geq 2$) or $\frac{3445.51}{2400}$ ($=1.4356\dots$) and 1.075^n evaluated, $n \geq 2$ A1 for 5 cao

1380/4H				
Question	Working	Answer	Mark	Notes
20	(a)			
	$\cos x = \frac{5}{8}$	51.3 - 51.35	3	<p>M1 for $\cos(x) = \frac{5}{8}$</p> <p>M1 for $\cos^{-1} \frac{5}{8}$ or $\cos^{-1} 0.625$, or $\cos^{-1}(5 \div 8)$</p> <p>A1 for 51.3 - 51.35 (SC B2 for 0.89 – 0.9 or 57 - 57.1 seen)</p> <p>Alternative Scheme $h^2 = 8^2 - 5^2 (=39)$</p> <p>M1 for $\sin(x) = \frac{\sqrt{39}}{8}$ or $\tan(x) = \frac{\sqrt{39}}{5}$ or</p> <p>$\frac{\sin x}{\sqrt{39}} = \frac{\sin 90}{8}$ oe or</p> <p>$(\sqrt{39})^2 = 8^2 + 5^2 - 2 \times 8 \times 5 \times \cos x$</p> <p>M1 for $\sin^{-1}(\frac{\sqrt{39}}{8})$ or $\sin^{-1}(\frac{\sqrt{39} \times \sin 90}{8})$ or</p> <p>$\tan^{-1}(\frac{\sqrt{39}}{5})$ or $\cos^{-1}(\frac{8^2 + 5^2 - (\sqrt{39})^2}{2 \times 8 \times 5})$</p> <p>A1 for 51.3 - 51.35</p>

1380/4H					
Question	Working	Answer	Mark	Notes	
	(b)	$\tan 40 = \frac{y}{12.5}$ $y = 12.5 \times \tan 40$	10.4 - 10.5	3	M1 for $\tan 40 = \frac{y}{12.5}$ M1 for $12.5 \times \tan 40$ A1 for 10.4 - 10.5 SC: B2 for $\pm(13.9 - 14.0)$ or 9 - 9.1 seen Alternative scheme M1 for $\frac{y}{\sin 40} = \frac{12.5}{\sin 50}$ oe M1 for $y = \frac{12.5}{\sin 50} \times \sin 40$ A1 for 10.4 - 10.5 SC: B2 for $\pm(35.4 - 35.5)$ or 10.39 - 10.396 seen
21	(a)	$\frac{26}{258} \times 50$	5	2	M1 for $\frac{a}{258} \times 50$ or $50 \div \frac{258}{a}$ oe, $a < 258$ or 5.03(8...) or $26 \div 5.16$ A1 for 5 cao
	(b)	$\frac{(25 + 48 + 62)}{258} \times 50$	26	2	M1 for $\frac{135}{258} \times 50$ or $\frac{(25 + 48 + 62)}{258} \times 50$ or $\left(\frac{25}{258} \times 50 + \frac{48}{258} \times 50 + \frac{62}{258} \times 50 \right)$ oe or 26.1(6...) or 5 + 9 + 12 or $135 \div 5.16$ A1 for 26 or 27

1380/4H				
Question	Working	Answer	Mark	Notes
22	$(9n^2 + 6n + 1) -$ $(9n^2 - 6n + 1)$ $= 12n$	$12n$ correct comment	3	M1 for $(3n)^2 + 3n + 3n + 1$ or $(3n)^2 - 3n - 3n + 1$ or $((3n+1) - (3n-1))((3n+1) + (3n-1))$ A1 for $12n$ from correct expansion of both brackets A1 for $12n$ is a multiple of 4 or $12n = 3 \times 4n$ or $12n = 4 \times 3n$ or $\frac{12n}{4} = 3n$ or $\frac{12n}{3} = 4n$ NB: Trials using different values for n score no marks.
23	(a) (b) $\vec{OP} = \vec{OA} + \vec{AP}$ $\vec{OP} = \mathbf{a} + \frac{3}{5}(\mathbf{b} - \mathbf{a})$ $\vec{OP} = \frac{1}{5}(2\mathbf{a} + 3\mathbf{b})$	$\mathbf{b} - \mathbf{a}$ proof	1 3	B1 for $\mathbf{b} - \mathbf{a}$ or $-\mathbf{a} + \mathbf{b}$ oe M1 for $\vec{OP} = \vec{OA} + \vec{AP}$ oe or $\vec{OP} = \vec{OB} + \vec{BP}$ oe M1 for $\vec{AP} = \frac{3}{5} \times "(\mathbf{b} - \mathbf{a})"$ oe or $\vec{BP} = \frac{2}{5} \times "(\mathbf{a} - \mathbf{b})"$ oe A1 for $\mathbf{a} + \frac{3}{5} \times (\mathbf{b} - \mathbf{a})$ oe or $\mathbf{b} + \frac{2}{5} \times (\mathbf{a} - \mathbf{b})$ oe leading to given answer with correct expansion of brackets seen

1380/4H				
Question	Working	Answer	Mark	Notes
24	$\frac{1}{2} \times 6 \times 6 \times \sin 60$ $- \frac{60}{360} \times \pi \times 3^2$ $= 15.588 - 4.712$	10.8 - 10.9	4	<p>M1 for $\frac{1}{2} \times 6 \times 6 \times \sin 60$ or for $0.5 \times 6 \times \sqrt{6^2 - 3^2}$ or 15.5 - 15.6 or 14.5 - 14.6 or $\pm 5.48(65\dots)$</p> <p>M1 for $\frac{60}{360} \times \pi \times 3^2 (= 4.712\dots)$</p> <p>M1(dep on 1 previous M1) for 'area of triangle' – 'area of sector'</p> <p>A1 for 10.8 – 10.9</p> <p>SC: B3 for 10.1 - 10.2 or 9.84 - 9.85</p>
25	$\frac{(x-3)\cancel{(x-5)}}{(2x+3)\cancel{(x-5)}}$	$\frac{(x-3)}{(2x+3)}$	3	<p>B1 for $(x-3)(x-5)$ or $x(x-5) - 3(x-5)$</p> <p>M1 for $(2x \pm 3)(x \pm 5)$ or $2x(x+5) \pm 3(x+5)$ or $2x(x-5) \pm 3(x-5)$</p> <p>A1 for $\frac{(x-3)}{(2x+3)}$ cao as final answer</p>

1380/4H				
Question	Working	Answer	Mark	Notes
26	$\frac{5}{20} \times \frac{7}{19} + \frac{5}{20} \times \frac{8}{19} + \frac{7}{20} \times \frac{5}{19} +$ $\frac{7}{20} \times \frac{8}{19} + \frac{8}{20} \times \frac{5}{19} + \frac{8}{20} \times \frac{7}{19}$ <p>or</p> $\left(\frac{5}{20} \times \frac{15}{19} + \frac{7}{20} \times \frac{13}{19} + \frac{8}{20} \times \frac{12}{19} \right)$ <p>or</p> $1 - \left(\frac{5}{20} \times \frac{4}{19} + \frac{7}{20} \times \frac{6}{19} + \frac{8}{20} \times \frac{7}{19} \right)$	$\frac{131}{190}$	4	<p>M1 for at least one product of the form $\frac{a}{20} \times \frac{b}{19}$</p> <p>M1 for identifying all products (condone 2 errors in 6 products, 1 error in 3 products)</p> <p>Either</p> $\left(\frac{5}{20} \times \frac{7}{19}, \frac{5}{20} \times \frac{8}{19}, \frac{7}{20} \times \frac{5}{19}, \frac{7}{20} \times \frac{8}{19}, \frac{8}{20} \times \frac{5}{19}, \frac{8}{20} \times \frac{7}{19} \right)$ <p>or</p> $\left(\frac{5}{20} \times \frac{15}{19}, \frac{7}{20} \times \frac{13}{19}, \frac{8}{20} \times \frac{12}{19} \right)$ <p>or</p> $\left(\frac{5}{20} \times \frac{4}{19}, \frac{7}{20} \times \frac{6}{19}, \frac{8}{20} \times \frac{7}{19} \right)$ <p>M1 (dep) for</p> $\left(\frac{5}{20} \times \frac{7}{19} + \frac{5}{20} \times \frac{8}{19} + \frac{7}{20} \times \frac{5}{19} + \frac{7}{20} \times \frac{8}{19} + \frac{8}{20} \times \frac{5}{19} + \frac{8}{20} \times \frac{7}{19} \right)$ <p>oe</p> <p>or $\left(\frac{5}{20} \times \frac{15}{19} + \frac{7}{20} \times \frac{13}{19} + \frac{8}{20} \times \frac{12}{19} \right)$ oe</p> <p>or $1 - \left(\frac{5}{20} \times \frac{4}{19} + \frac{7}{20} \times \frac{6}{19} + \frac{8}{20} \times \frac{7}{19} \right)$ oe</p> <p>A1 for $\frac{131}{190}$ oe or 0.68947... correct to at least 2 decimal places or answer that rounds to 0.69</p> <p>NB : If decimals used for products then must be correct to at least 2 decimal places</p>

				<p>With replacement</p> <p>M0</p> <p>M1 for identifying all products (condone 2 errors in 6 products, 1 error in 3 products)</p> <p>either</p> $\left(\frac{5}{20} \times \frac{7}{20}, \frac{5}{20} \times \frac{8}{20}, \frac{7}{20} \times \frac{5}{20}, \frac{7}{20} \times \frac{8}{20}, \frac{8}{20} \times \frac{5}{20}, \frac{8}{20} \times \frac{7}{20} \right) \text{ or}$ $\left(\frac{5}{20} \times \frac{5}{20}, \frac{7}{20} \times \frac{7}{20}, \frac{8}{20} \times \frac{8}{20} \right) \text{ or}$ $\left(\frac{5}{20} \times \frac{15}{20}, \frac{7}{20} \times \frac{13}{20}, \frac{8}{20} \times \frac{12}{20} \right)$ <p>M1 (dep) for</p> $\left(\frac{5}{20} \times \frac{7}{20} + \frac{5}{20} \times \frac{8}{20} + \frac{7}{20} \times \frac{5}{20} + \frac{7}{20} \times \frac{8}{20} + \frac{8}{20} \times \frac{5}{20} + \frac{8}{20} \times \frac{7}{20} \right)$ <p>or</p> $\left(\frac{5}{20} \times \frac{15}{20} + \frac{7}{20} \times \frac{13}{20} + \frac{8}{20} \times \frac{12}{20} \right)$ <p>or $1 - \left(\frac{5}{20} \times \frac{5}{20} + \frac{7}{20} \times \frac{7}{20} + \frac{8}{20} \times \frac{8}{20} \right)$</p> <p>A0 for $\frac{262}{400}$ oe or 0.655 (NB: $\frac{262}{400}$ oe or 0.655 implies M2)</p> <p>Partial replacement</p> <p>SC: B2 for $\frac{141}{200}$ oe or 0.705 or $\frac{121}{190}$ oe or 0.6368... correct to at least 2 decimal places</p>
--	--	--	--	--