

PAPER 5506				
No	Working	Answer	Mark	Notes
1		Question	2	B1 for each of the following upto B2 (a) an improved question eg time frame made clear (b) response boxes (imperfect) (c) response boxes no errors OR For suggesting a generally improved question (a) a question clearly in the context of changes to the canteen (b) at least 3 boxes showing a full range of responses
2	Locus (circle) drawn & shaded		2	B1 circle centre Manchester $\pm 2\text{mm}$ B1 shading with accurate or approximate circle within tolerance
3	(a)	182, 178, 180, 184	2	M1 mean of any three consecutive months, eg $(147 + 161 + 238) \div 3$ oe A1 cao
	(b) Sale price = 80% Fun Friday price = 70% of 80% = 56% (oe)		2	B1 B1 for a fully correct explanation involving a worked example (oe) B1 a partially complete explanation
4	x $x^3 - 2x$ 4.1 60.7(21) 4.2 65.6(88) 4.3 70.9(07) 4.22 66.7(114) 4.23 67.2(269) 4.24 67.7(45) 4.25 68.2(656)	4.2	4	B2 for trial $4.1 \leq x \leq 4.3$ evaluated (B1 for trial $4 < x < 5$ evaluated) B1 for different trial $4.225 \leq x \leq 4.25$ evaluated B1 (dep on at least one previous B1) for 4.2 cao

PAPER 5506				
No	Working	Answer	Mark	Notes
5	(a)	1.0×10^{-9}	1	B1 accept 1×10^{-9} or just 10^{-9}
	(b) $1 \div (5 \times 10^{-9})$	2×10^8	2	M1 for $1 \div$ (“ 5×10^{-9} ”) or digit 2 with zeros only seen Condone omission of bracket for M1. A1 cao
6	(a) $\frac{6.27 \times 4.52}{4.81 + 9.63} = \frac{28.3404}{14.44} = 1.962631579$	1.9626...	2	B2 for 1.9626... (B1 for 28.34... or 14.44)
	(b)	1.96	1	B1 ft from (a) as rounded to 1dp or 2dp. Do not accept 2, 2.00, but accept 2.0
7		$d = 4n + 6$	2	B2 $d = 4n + 6$ oe (B1 $d = 4n + k$, k an integer $\neq 6$, $4n + 6$, $n = 4n + 6$)
8	Vol = $\pi \times 3.8^2 \times 2.5 = \pi \times 14.44 \times 2.5$ = $45.36... \times 2.5 = 113.411$ Mass = “113” $\times 1.5 = 170.1165$	170	4	M1 for $\pi \times r^2 \times 2.5$ where $r =$ is 3.8 or 7.6 A1 if $r = 3.8$ M1 for “113” $\times 1.5$ A1 for 169.5 – 170.3 cao

PAPER 5506					
No	Working		Answer	Mark	Notes
9	(a)	$10^2 + 6^2$ or 136 $\sqrt{(100 + 36)}$ or $\sqrt{136} = 11.66\dots$	11.7	3	M1 for $10^2 + 6^2$ or 136 seen M1 (dep) $\sqrt{100 + 36}$ or $\sqrt{136}$ A1 11.66 – 11.7
	(b)	$\cos x = 8/10$ or 0.8 $x = \cos^{-1} 0.8 = 36.869^\circ$	36.9	3	M1 for $\cos = \frac{8}{10}$, $\cos = 0.8$ (oe) M1 (dep) for \cos^{-1} (oe) A1 for 36.86 – 36.9 M1 Use of sine rule and x found M1 for $x = 90 - \sin^{-1}("0.8")$ A1 for 36.86 – 36.9
10	$18x - 6y = 99$ $8x + 6y = 18$ $26x = 117$	$12x - 4y = 66$ $12x + 9y = 27$ $-13y = 39$	$x = 4 \frac{1}{2}$ $y = -3$	4	M1 correct process to eliminate either x or y (condone one error) A1 cao for non – eliminated one. M1 (dep on 1 st M1) for correct substitution of their found value. A1 cao (need both)

PAPER 5506				
No	Working	Answer	Mark	Notes
11	$\frac{133}{72} = 1.8472, \frac{160}{82} = 1.9512$ OR $\frac{72}{133} = 0.54135, \frac{82}{160} = 0.5125$ OR $\frac{160}{133} = 1.203..., \frac{82}{72} = 1.1388....$ OR $\frac{133}{160} = 0.83125..., \frac{72}{82} = 0.878$	1.84..≠ 1.95.. 1.20..≠ 1.13..	3	M1 for $\frac{133}{72}$ (= 1.8472...) oe Accept 1.8, 1.85 M1 for $\frac{160}{82}$ (=1.9512...) oe consistent pairing Accept 2.0, 1.9 OR M1 for $\frac{160}{133}$ (= 1.203...) oe M1 for $\frac{82}{72}$ (=1.1388) oe A1 for enough decimal places to show that the ratios are not equal; since the scale factors are different the shapes cannot be similar. NB Do Not need conclusion
12 (a)	$£12000 \times 0.25 = £3000; £12000 - £3000 = £9000$ $£9000 \times 0.25 = £2250; £9000 - £2250 = £6750$ $£6750 \times 0.25 = £1687.50; £6750 - £1687.50 =$	£5062.50	3	M1 for 12000×0.75 (=9000) oe or £3000 or £23437.50 seen M1 (dep) for at least two further depreciation calculations (complete steps) A1 cao OR M2 for $12000 \times (0.75)^3$ or 5062.50 seen (M1 for $12000 \times (0.75)^n, n = 2$ or 4)
(b)	$0.8 \times 0.8 \times 0.8 \times 0.8$ (oe)	0.4096	2	M1 0.8^4 (oe) A1 cao

PAPER 5506				
No	Working	Answer	Mark	Notes
13	$r^2 = \frac{3 \times 10}{\pi h} = \frac{3 \times 10}{\pi 1.5} = \frac{3 \times 10}{4.712..} = 6.36, 6.37$ $r = \sqrt{6.366...}$	2.52-2.54	3	M1 for correct rearrangement to give $r^2 = \frac{3V}{\pi h}$ or $30 \div 4.712..$ or $6.36 - 6.37$ Allow 0.3, 0.33 for $\frac{1}{3}$ M1 (dep) for $\sqrt{\quad}$ A1 cao 2.52 – 2.54
14	(a)	0.4 0.6,0.4, 0.6,0.4	2	B1 for LHS: (0.6), 0.4 B1 for RHS: 0.6, 0.4, 0.6, 0.4
	(b)	0.6×0.6	2	M1 $0.6 \times "0.6"$ [$0 < "0.6" < 1$] A1 cao
	(c)	$(30 \times 42) - (25 \times 42.8) = (1260 - 1070 = 190)$ $190 \div 5 =$	3	M1 for $(30 \times 42) - (25 \times 42.8)$ or $1260 - 1070$ or 190 seen M1(dep) for "190" $\div 5$ A1 cao 38

PAPER 5506

	No	Working	Answer	Mark	Notes
15	(a)	$S = \frac{k}{f^2}; 125 = \frac{k}{8^2}; k = 8000$	$S = \frac{8000}{f^2}$	3	<p>M1 for $S = \frac{k}{f^2}$</p> <p>M1 for $125 = \frac{k}{8^2}$</p> <p>A1 cao</p> <p>These marks can be awarded if the full formula appears in part (b), rather than in part (a).</p> <p>[SC: $S = \frac{125}{64} f^2$ M1 M0 A0, $S = 1.95(3125) f^2$ M1 M0 A0 $S = \frac{1000}{f}$ M1 M0 A0]</p>
	(b)		500	1	B1 cao

PAPER 5506				
No	Working	Answer	Mark	Notes
16	$0.5 \times 3.2 \times 8.4 \times \sin B = 10$ $\sin B = 0.74404\dots$ 48.077 $AC^2 = 3.2^2 + 8.4^2 - 2 \times 3.2 \times 8.4 \times \cos B$ $AC^2 = 44.8815\dots$ $AC = 6.69$ (936...) Perimeter = 18.3 Use the altitude AD , $\frac{h \times 8.4}{2} = 10 \Rightarrow h = (2.381)$ $BD = \sqrt{3.2^2 - h^2} = 2.139$ $DC = 6.261$ $AC = \sqrt{2.38^2 + 6.261^2} = 6.69(936)$ Perimeter = 18.3	18.3	6	M1 for $0.5 \times 3.2 \times 8.4 \times \sin B (= 10)$ A1 for $\sin B = 0.74(404\dots)$ or $B = 47.7 - 48.1$ M1 for $3.2^2 + 8.4^2 - 2 \times 3.2 \times 8.4 \times \cos "48.077"$ M1(dep) for $AC^2 = "44.8(815)" \dots$ with correct order of evaluation A1 $AC = 6.69 - 6.7$ A1 18.29 - 18.3 for $\frac{h \times 8.4}{2} = 10 \Rightarrow h = (2.381)$ M1 for $BD^2 = 3.2^2 - "2.381"{}^2$ A1 $BD = 2.1 - 2.2$ M1 (dep) $AC^2 = "2.381"{}^2 + "6.261"{}^2$ A1 $AC = 6.69 - 6.7$ A1 18.29 - 18.3

PAPER 5506

No	Working	Answer	Mark	Notes
19	<p>(a) $x^2 + 6^2 = 25$ $x^2 = -11$</p> <p>(b) $y^2 = (2x - 2)^2$ $x^2 + (2x - 2)^2 = 25$ $x^2 + 4x^2 - 8x + 4 = 25$ $5x^2 - 8x + 4 - 25 = 0$ $5x^2 - 8x - 21 = 0$ $(5x + 7)(x - 3) = 0$ or $x = \frac{- -8 \pm \sqrt{(-8)^2 - 4 \times 5 \times (-21)}}{10} = \frac{8 \pm \sqrt{484}}{10}$ So $x = 3$, or $x = -1.4$ Subs into either equation gives: $y = 4$, or $y = -4.8$</p>	<p>$x = 3$ $y = 4$</p> <p>$x = -1.4$ $y = -4.8$</p>	<p>2</p> <p>6</p>	<p>M1 substitutes $y=6$ to get $x^2+36 = 25$ A1 deduces $x^2=25-36<0$; impossible, (so line does not intersect curve)</p> <p>M1 $y^2=(2x-2)^2$ seen or implied A1 $x^2 + 4x^2 - 8x + 4 = 25$ (oe expanded form) M1 correct attempt to solve 3 term quadratic equation A1 $x = 3, x = -1.4$</p> <p>M1 (dep on previous Ms) Sub one value of x into either equation gives: A1 $y = 4, y = -4.8$ NB: incorrectly matched pairs loses the final A1.</p>

PAPER 5506					
No	Working	Answer	Mark	Notes	
20	(a)	$400.005 \div 59.95 = 6.672310$ $6.672310 \div 1000 \times 3600 = 24.02032$ $399.995 \div 60.05 = 6.661032$ $6.661032 \div 1000 \times 3600 = 23.97972$	24.020 23.980	5	B1 for 400.005 or 59.95 seen oe M1 for "400.005" \div "59.95" where "400.005" $\in [400.005, 400.5]$ and "59.95" $\in [59.5, 59.95]$ oe B1 for 399.995 or 60.05 seen oe M1 for "399.995" \div "60.05" where "399.995" $\in [399.5, 399.95]$ and "60.05" $\in [60.05, 60.5]$ oe A1 23.979-23.980 and 24.020-24.0204
	(b)	24.0 because to 1dp the answers are the same		1	B1cao for 24.0 with reason
	(c)	$177 \times 50/477 = 18.553 \rightarrow 19 \rightarrow 18$ $111 \times 50/477 = 11.635 \rightarrow 12$ $86 \times 50/477 = 9.0147 \rightarrow 9$ $82 \times 50/477 = 8.595 \rightarrow 9$ $21 \times 50/477 = 2.201 \rightarrow 2$	18 12 9 9 2	3	M1 for $\frac{50}{"477"} \times 177$ or 111 or 86 or 82 or 21 A1 for all integers or better answers, at least 3 correct A1 cao
21	(a)	$40 - x = 3(4 + x)$ $40 - x = 12 + 3x$ $40 - 12 = x + 3x$ $4x = 28$	7	3	M1 multiplying through by 3: $3 \times \frac{40 - x}{3} = 3 \times 4 + 3 \times x$ A1 $40 - 12 = x + 3x$ A1 cao
	(b)	$\frac{2x(2x - 3)}{(2x - 3)(2x + 3)} = \frac{2x}{2x + 3}$	$\frac{2x}{2x + 3}$	3	B1 for $(2x-3)(2x+3)$ B1 for $2x(2x-3)$ or $(2x + 0)(2x + 3)$ B1 cao

PAPER 5506				
No	Working	Answer	Mark	Notes
22	Distance from x axis is y . Distance from $(0, 2)$ is $\sqrt{(x^2 + (y - 2)^2)}$ $y^2 = x^2 + (y - 2)^2$ $y^2 = x^2 + y^2 - 4y + 4$ $0 = x^2 - 4y + 4$ $4y = x^2 + 4$ and finish		4	B1 for $(x - 0)^2 + (y - 2)^2$ or $\sqrt{((x - 0)^2 + (y - 2)^2)}$ oe seen B1 for $y = \sqrt{(x - 0)^2 + (y - 2)^2}$ or $y^2 = (x - 0)^2 + (y - 2)^2$ oe B1 $(y - 2)^2 = y^2 - 4y + 4$ seen B1 for $4y = x^2 + 4$ and finish