

Name: \_\_\_\_\_

---

# Year 11 Predicted paper 2017

## Higher Mark Scheme

Date:

---

Time:

Total marks available:

Total marks achieved: \_\_\_\_\_

---

---

## Mark Scheme

Q2.

Paper 1MA1: 2H			
Question	Working	Answer	Notes
(a)		Sketch	P1 Parabola passes through all three of the points (0, 4), (2,0), (4,4)
(b)		Sketch	P1 Parabola passes through all three of the points (-4, -1), (-2, 3), (0, -1)

Q3.

Question	Working		Answer	Mark	AO	Notes
(a)	Lv	9		P	2.3a	P1 for process to interpret diagram, e.g. identify any quartile
	Lq	16				
	M	24		P	2.3a	P1 for further interpretation in order to draw box plot with at least three correct from Lv, Lq, M, Uq, Uv
	Uq	30				
	Uv	39				
	2013		C	2.3b	C1 for fully correct box plot	
(b)			Correct comparisons	C	2.3b	C1 ft for a correct comparison in context of central tendency
				C	2.3b	C1 ft for a correct comparison in context of any measure of spread

Q4.

Question	Working	Answer	Notes
		$x = 4.5$ $y = -2.5$	M1 for a correct process to eliminate one variable (condone one arithmetic error) A1 cao for either $x$ or $y$ M1 (dep) for substituting found value into one of the equations or appropriate method after starting again (condone one arithmetic error) A1 cao

Q5.

Question	Working	Answer	Notes
		10.4	P1 starts process by using cosine rule to find $CD$ eg $(CD)^2 = 4.9^2 + 3.8^2 - 2 \times 4.9 \times 3.8 \times \cos 80$ (= 31.98..) P1 uses sine rule to find angle $ACD$ or angle $ADC$ eg $\frac{\sin C}{3.8} = \frac{\sin 80}{5.655}$ or $\frac{\sin D}{4.9} = \frac{\sin 80}{5.655}$ P1 uses sine rule to find $BC$ or $BD$ eg $\frac{BD}{\sin 25} = \frac{5.655}{\sin 33.6}$ P1 process to find area eg $1/2 ab \sin C$ A1 for 10.4 to 10.43

Q6.

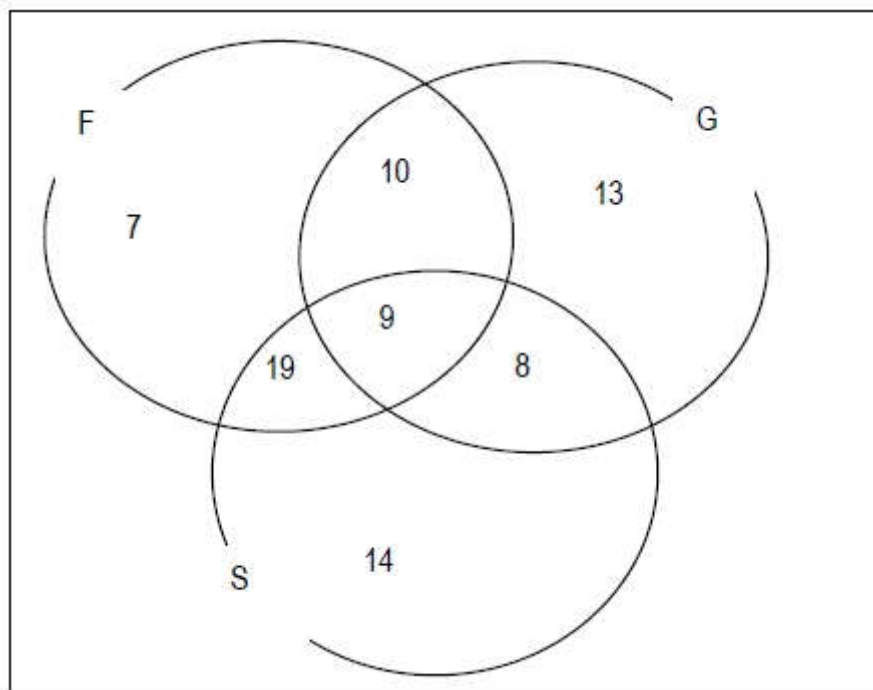
Question	Working	Answer	Mark	AO	Notes
(a)(i)		Correct drawing	M	1.3a	M1 for a correct bearing drawn or for a correct distance drawn or quoted
(a)(ii)		230°	A	1.3a	A1 for a correct position of <i>B</i>
			B	1.1	B1 for 230° cao
(b)		Correct statement with evidence	P	2.3a	P1 for drawing a correct right-angle triangle showing line East from <i>A</i> and perpendicular from <i>B</i> (can be implied by correct trigonometric ratio)
			M	1.3b	M1 for $\cos 50^\circ = \frac{d}{36}$ oe
			P	2.2	P1 for $36 \times \cos 50^\circ$ oe
			C	2.1a	C1 for deduction 23.14 km plus a statement saying that the ship is always more than 23 km from the lighthouse

Q7.

Paper 1MA1:3H			
Question	Working	Answer	Notes
		431	B1 for use of Pythagoras involving the unknown length P1 for setting up an equation equivalent to $x^2 = 15^2 - 5^2 - 7^2$ P1 for finding the volume using their " $\sqrt{15^2 - 5^2 - 7^2}$ " A1awrt 430.5

Q8.

Question	Working	Answer	Mark	AO	Notes
(a)	Venn diagram	Correct diagram (See diagram at end)	P  P  C	2.3a  2.3a  2.3b	P1 to begin to interpret given information, e.g. 3 overlapping labelled ovals with central region correct  P1 to extend interpretation of given information, e.g. 3 overlapping labelled ovals with at least 5 regions correct  C1 for correct process to communicate given information, e.g. 3 overlapping labelled ovals with all regions correct, including outside
(b)		$\frac{23}{80}$	B	1.3a	B1 ft diagram
(c)		$\frac{19}{40}$	M  A	1.3a  1.3a	M1 for probability with denominator 40  A1 $\frac{19}{40}$ oe



Question	Working	Answer	Notes
(a)(i)		10, 12, 14, 15, 16, 18	B1 cao
(ii)		12, 18	B1 cao
(b)		$\frac{7}{10}$	M1 for 7 or indicating correct region or for 10, 14, 16, 11, 13, 17, 19 listed  A1 for $\frac{7}{10}$ oe

Q10.

Question	Working	Answer	Notes
(a)		1.0 – 1.3	M1 for finding gradient by drawing tangent M1 for method to calculate gradient A1 For 1.0 – 1.3
(b)			C1 for acceleration C1 for eg “ 4 second after the start of the race”, “when the speed is 7.6 m/s”, “in m/s <sup>2</sup> ”
(c)		limitation	C1 for comment, eg dependent on accuracy of constructing a tangent

Q11.



Paper 1MA1: 3H			
Question	Working	Answer	Notes
(a)	$F(x) = x^3 + 4x - 1$ $F(0) = -1, F(1) = 4$	Shown	M1 Method to establish at least one root in $[0,1]$ eg. $x^3 + 4x - 1 (= 0)$ and $F(0) (= -1), F(1) (= 4)$ oe A1 Since there is a sign change there must be at least one root in $0 < x < 1$ (as F is continuous)
(b)	$4x = 1 - x^3$ Or $\frac{x^3}{4} + x = \frac{1}{4}$	Shown	C1 C1 for at least one correct step and no incorrect ones
(c)	$x_1 = \frac{1}{4} - \frac{0}{4} = \frac{1}{4}$ $x_2 = \frac{1}{4} - \frac{\left(\frac{1}{4}\right)^3}{4} = \frac{1}{4} - \frac{1}{256}$	0.246(09375) Or $\frac{63}{256}$	B1 $x_1 = \frac{1}{4}$ M1 M1 for $x_2 = \frac{1}{4} - \frac{\left(\frac{1}{4}\right)^3}{4}$ A1 A1 for 0.246(09375) or $\frac{63}{256}$ oe

Q12.

Paper 1MA1: 2H			
Question	Working	Answer	Notes
		10169 or 10170	P1 for correct use of formula to find number in 2016, eg. $1.05(9500 - 250) (= 9712.5)$ P1 for complete iterative process, eg. 2017: $1.05(9712.5 - 250) (= 9935.625)$ 2018: $1.05(9935.625 - 250)$ C1 for answer of 10169.90... correctly rounded or truncated to nearest whole number

Q13.

Question	Working	Answer	Notes
(a)		18	B1 cao
(b)		$5(x - 1)$	M1 for method to find inverse function A1 for $5(x - 1)$ or $5x - 5$
(c)		$9x - 48$ shown	M1 for method to find composite function A1 for working leading to $9x - 48$

Q14.

Paper 1MA1:3H			
Question	Working	Answer	Notes
		Region R	M1 for one line correctly drawn M1 for two or more lines correctly drawn A1 for a correct region indicated between two correct lines A1 fully correct region indicated with all lines correct

Q15.

Question	Working	Answer	Mark	AO	Notes
		A correct right-angled triangle constructed	P	2.3a	P1 for a construction of a right angle at C or D (construction arcs must be seen)
			P	2.3b	P1 (indep) for the correct height of the triangle drawn or shown
			P	2.3b	P1 for a fully correct constructed triangle



## Q16.

Question	Working	Answer	Mark	AO	Notes
	$\frac{1000 \times 13.915}{8.25^2 \times 83.5}$ $= 2.448$	2.4 g/cm <sup>3</sup>	B	1.1	B1 for $83.5 \leq h < 84.5$ or $8.25 \leq d < 8.35$ (or correct bounds) or $13.905 \leq M < 13.915$ (or correct bounds). Accept $h = 84.5$ or $d = 8.35$ or $M = 13.915$
	$\frac{1000 \times 13.905}{8.35^2 \times 84.5}$ $= 2.360$		P	3.1c	P1 for correct process to find upper bound of $D$ (= 2.4(48... or 0.0024(48...)) oe
			P	3.1c	P1 for correct process to find lower bound of $D$ (= 2.3 (60... or 0.0023(6...)) oe
			P	2.4a	P1 for an explanation or a correct process to find $D$ to an appropriate degree of accuracy
			A	1.3a	A1 2.4 g/cm <sup>3</sup>

## Q17.

Question	Working	Answer	Notes
	$\sqrt{8.35^2 - 6.05^2}$	5.754997828	<p>B1 for finding bounds of one measurement, 8.25, 8.35, 6.05 or 6.15</p> <p>P1 for process of choosing and using correct bounds</p> <p>P1 for process of Pythagoras' rule with correct bounds</p> <p>A1 for 5.754(997...)</p>

Q18.

Paper 1MA1: 2H			
Question	Working	Answer	Notes
		1361	<p>P1 process using similar triangles to find base of small cone eg. 4 cm used as diameter or 2 cm used as radius</p> <p>P1 process to find volume of one cone</p> <p>P1 complete process to find volume of frustum</p> <p>P1 complete process to find mass or 1360 – 1362</p> <p>A1 1361 or 1360 or 1400</p>

Q19.

Paper 1MA1: 3H			
Question	Working	Answer	Notes
	$x = \frac{-5 \pm \sqrt{(-5)^2 - 4 \times 1 \times 3}}{2} =$ $\frac{5 \pm \sqrt{13}}{2}$	4.30 or 0.697	<p>M1 Substitute into quadratic formula - allow sign errors</p> <p>M1 Evaluate as far as <math>\frac{5 \pm \sqrt{13}}{2}</math></p> <p>A1</p>

Q20.

Paper 1MA1: 2H			
Question	Working	Answer	Notes
		8.63 to 8.65	<p>P1 for a start of process, eg.  <math>0.5x(x - 2) = 2.5</math></p> <p>P1 for rearranging to give a quadratic equation,  eg <math>x^2 - 2x - 5 = 0</math> oe.</p> <p>P1 for a process to solve the quadratic equation, condoning one sign error in use of formula (<math>x = 3.449\dots</math> and <math>x = -1.449\dots</math>)</p> <p>P1 for selecting the positive value of <math>x</math> and applying Pythagoras to find the hypotenuse,  eg. <math>\sqrt{(3.449^2 + 1.449^2)}</math> (= 3.74...)</p> <p>A1 for complete process to find perimeter  for answer in the range 8.63 to 8.65</p>

Q21.

Paper 1MA1: 2H			
Question	Working	Answer	Notes
(a)		0.49	<p>M1 for <math>0.7 \times 0.7</math></p> <p>A1 for 0.49 oe</p>
(b)		0.51	<p>M1 for a correct process, eg. 1 – "0.49"  or <math>0.7 \times 0.3 + 0.3 \times 0.7 + 0.3 \times 0.3</math></p> <p>A1 for 0.51 oe</p>

Q22.

Question	Working	Answer	Notes
(a)		$2(x+4)^2 + 3$	P1 process to find $a$ , eg $2x^2 + 16x + 35 = 2(x^2 + \dots)$ or $a = 2$ P1 for $2((x+4)^2 + \dots)$ or $b = 4$ A1 for $2(x+4)^2 + 3$ or $a = 2, b = 4, c = 3$
(b)		$(-4, 3)$	B1 fit from answer of form $a(x+b)^2 + c$

Q23.

Paper 1MA1: 2H			
Question	Working	Answer	Notes
(a)		$(1, 4)$	B1
(b)		$-0.4, 2.4$	B1
(c)		$3.75$	B1 accept $3.7 - 3.8$

Q24.

Paper 1MA1:3H			
Question	Working	Answer	Notes
		55	P1 for $\sqrt{\frac{253.5}{6}}$ (=6.5) P1 for $2 \times "6.5"{}^3 \div 10$ (=54.925) A1 cao

Q25.

$$y^2 - 2y - 35 < 0$$

$$(y+5)(y-7) < 0$$

Critical values = -5 and 7

$$-5 < y < 7$$

