www.xtrapapers.com

Mark Scheme (Results)

Summer 2018

Pearson Edexcel International GCSE
In Mathematics A (4MA1) Paper 2F

www.xtrapapers.com

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2018
Publications Code 4MA1_2F_1806_MS
All the material in this publication is copyright
© Pearson Education Ltd 2018

www.xtrapapers.com

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

International GCSE Maths A June 2018 – Paper 2F Mark scheme					
Apart from Questions 20 and 23 where the mark scheme states otherwise, the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.					
Question	**Working**	**Answer**	**Mark**	**Notes**	
1 (a)		$\frac{63}{100}$	1	B1	
(b)		46800	1	B1	
(c)		73.7	1	B1	
(d)		9	1	B1	
				Total 4 marks	

2 (a)		E	1	B1	Accept 0.2
(b)		D	1	B1	
(c)		C	1	B1	Accept 0.5
				Total 3 marks	

3	400 and 1300 or 900		3	M1	read scales correctly **or** 1300 × 0.4 (=520) **or** 400 × 0.4 (=160) **or** 9 × 0.4 (=3.6) **or** (x – y) × 0.4 where x and y are readings and x = 1300 or y = 400
	$(1300-400)\times 0.4$ **or** "520" – "160"			M1	Difference of both correct readings × 0.4 oe
		360		A1	cao
				Total 3 marks	

Question		Working	Answer	Mark	Notes	
4	(a)		(2, –1)	1	B1	
	(b)		3.6	1	B1	Allow 3.4 to 3.8 and answers written as fractions in this range eg 3½
	(c)		D marked at (–1, –1)	1	B1	
						Total 3 marks

5	(a)		24	1	B1	Accept 32 or 40 or 48
	(b)		2	1	B1	
	(c)		No It is divisible by 3	1	B1	Only consider reason if No is given. Allow any reason that shows a clear understanding of why 57 is not prime, eg it is divisible by 19 **or** 3 **or** equal to 3 × 19.
						Total 3 marks

6	(a)		correct pattern	1	B1	5 dots × 5 dots open square
	(b)		16, 20	1	B1	
	(c)	eg 4 × 13 **or** 14 + 14 + 12 + 12 **or** 12 × 4 + 4 **or** 24, 28, 32, 36, 40, 44, 48, 52 **or** a fully correct diagram		2	M1	allow 1 arithmetical error in continuing the sequence to 13 terms
			52		A1	
	(d)		$4n$	1	B1	oe eg $n + n + n + n$ or $4 + (n - 1)4$
	(e)	90 ÷ 4 (= 22.5) or 88		2	M1	or continuing the sequence to 88 or 92 with just one error
			22		A1	
						Total 7 marks

Question		Working	Answer	Mark	Notes
7	(a)		7^5	1	B1
	(b)	$64=8^2$ **or** $64=4^3$ **or** $\sqrt{64}=8$ **or** $\sqrt[3]{64}=4$ **or** 8 × 8 = 64 **or** 4 × 4 × 4 = 64 **or** 1, 4, 9, 16, 25, 36, 49, 64 **or** 1, 8, 27, 64		2	M1
			$64=8^2$ and $64=4^3$		A1 or $\sqrt{64}=8$ and $\sqrt[3]{64}=4$ or correct list of square & cube numbers to 64
	(c)		1331	1	B1
	(d)		9.9	1	B1
					Total 5 marks

8	(a)	25 – 4 × – 3 **or** 25 – – 12 **or** 25 + 12		2	M1	Correct substitution
			37		A1	
	(b)	$2x^2 + x$		3	M1	
		(+)$3x$ – 6			M1	indep
			$2x^2 + 4x + 1$		A1	cao
						Total 5 marks

Question		Working	Answer	Mark	Notes	
9	(a)		Segment shaded	1	B1	Accept minor segment or major segment.
	(b)		Chord	1	B1	
	(c)	$\angle OQT = 90^{\circ}$ **and** $\angle OQT = 18^{\circ}$ **or** 90 – 18		3	M1	For 90° **and** 18° correctly identified in the working or on the diagram or for 90 – 18 or for other fully correct method
			72		A1	
		Angle between tangent and radius is 90 degrees			B1	Correct reason for 90° angle [If used alternate segment theorem]
						Total 5 marks

10	(a)	$\frac{36+33}{135}$		2	M1	for numerator of 36 + 33(= 69) **or** denominator of 135
			$\frac{69}{135}$		A1	Accept 0.51(11...) **or** 51.(11...)% 2 sf or better
	(b)	$\frac{27}{135} \times 360$ **or** 360 ÷ 5 **or** 27 × $\frac{8}{3}$ oe		2	M1	allow use of $\frac{8}{3}$ =2.666... to 1 dp truncated or rounded
			72		A1	cao
						Total 4 marks

Question		Working	Answer	Mark	Notes	
11	(a)	4.3333(3…) + 0.37894(7…) **or** $\frac{13}{3}+\frac{36}{95}$		2	M1	Evaluate either fraction correctly as a decimal to at least 5SF(rounded or truncated) or as a simplified fraction or an answer of 4.71(2)
			4.7122(80702)		A1	Correct to at least 5SF (rounded or truncated).
	(b)		4.71	1	B1	ft if at least 4SF given in (a) (not $4.71\dot{}$)
						Total 3 marks

12	(a)	0.5 × 2 × 3		3	M1	Accept even if added to another area
			3 cm^2		A1 B1	for 3 for units
	(b)		alternate angles	1	B1	'alternate' or 'alternating' or equivalent statement
	(c)		$y=4$	1	B1	
						Total 5 marks

Question	Working	Answer	Mark	Notes
13 (a)	$\frac{2000-800}{300}$ (= 4) **or** $\frac{2000-800}{150}(=8)$ **or** −8 seen correctly in working		3	M1 Accept 300 + 300 + 300 + 300 **or** 800, 1100, 1400, 1700, 2000 oe
	6 – "4" × 2			M1
		-2		A1
(b)	$\frac{12}{5}$ (= 2.4 hr) **or** $\frac{12}{5}\times 60$ (= 144 min or 2 hr 24 mins)		3	M1
	$\frac{800}{10}$ (= 80 min) **or** $\frac{800}{10}\div 60$ (=$1.3\dot{3}$ or 1 hr 20 min)			M1 indep
		3 hr 44 min		A1
				Total 6 marks

Question	Working	Answer	Mark	Notes
14 (a)	7 outcomes with at least one **C**		2	M1 Identify at least 6 (with no more than 2 incorrectly identified) outcomes with at least one **C** or an answer of $\frac{6}{16}$ **or** $\frac{8}{16}$ **or** $\frac{7}{n}$ where $n >$ 7
		$\frac{7}{16}$		A1 Or 0.4375 or 43.75% (allow 2dp rounded or truncated)
(b)	$\frac{7}{16} \times 80$		2	M1 ft from (a) for value between 0 and 1 **or** for an answer of $\frac{35}{80}$
		35		A1 ft from (a)
				Total 4 marks

15	$\frac{180-80}{2}$ (= 50)		3	M1 could be marked correctly on diagram or in working with no contradiction
	360 –"50" – 90			M1 dep on first M1
		220		A1 cao
				Total 3 marks

Question	Working	Answer	Mark	Notes
16	$\frac{3450}{2+6+7}$ (=230) **or** $\frac{2}{2+6+7}\times 3450(=460)$ **or** $\frac{7}{2+6+7}\times 3450(=1610)$ **or** $\frac{7-2}{2+6+7}$ $\left(=\frac{1}{3}\right)$		3	M1
	(7 – 2) × "230" **or** 7 × "230" – 2 × "230" **or** "1610" – "460" **or** $"\frac{1}{3}"\times 3450$			M1 dep
		1150		A1
				Total 3 marks

17	$\frac{8}{100}\times 20000$ (=1600)		4	M1oe	Award M2 for 20000×1.08 or 21600
	$20000+\frac{8}{100}\times 20000$ (=21600) **or** (20 000 – 19200) + $\frac{8}{100}\times 20000$ (=2400)			M1	
	$\frac{"21600"-19200}{19200}(\times 100)$ **or** $\frac{"2400"}{19200}(\times 100)$ **or** "21600" ÷ 19200 (×100) oe			M1	or for 1.125 or $\frac{9}{8}$ or 112.5%
		12.5		A1	oe
					Total 4 marks

Question	Working	Answer	Mark	Notes
18 (a)	$ac=M+bd$ **or** $-ac = -M - bd$ **or** $\frac{M}{c}=a-\frac{bd}{c}$		2	M1 For a correct first stage
		$a=\frac{M+bd}{c}$		A1 oe, eg $a=\frac{M}{c}+\frac{bd}{c}$, $a=\frac{-M-bd}{-c}$ [must have been seen with a = to award accuracy mark]
(b)	$5x<39+4$ oe		2	M1 Accept as equation or with the wrong inequality sign. Also award M1 for an answer of 8.6 or 8.6 with an = sign or the incorrect inequality sign.
		$x<8\frac{3}{5}$		A1 Accept $x<\frac{43}{5}$ **or** $x<8.6$ **or** $[-\infty, 8.6)$
(c)	eg $6e^2(3f^3-2ef)$, eg $2f(9e^2f^2-6e^3)$ eg $ef(18ef^2-12e^2)$		2	M1 Any correct partially factorised expression with at least 2 terms in the common factor **or** for the correct common factor and a 2 term expression inside the brackets with just one error
		$6e^2f(3f^2-2e)$		A1
				Total 6 marks

Question	Working	Answer	Mark	Notes
19 (a)	$2\times\pi\times0.56\times1.6$		2	M1 Award even if part of a calculation including 1 or 2 circles
		5.63		A1 awrt 5.63
(b)	$\frac{0.6}{1.6}$ (=0.375) **or** $\frac{1.6}{0.6}$ $(=\frac{8}{3}=2.\dot{6})$ **or** $\frac{r}{0.56}=\frac{0.6}{1.6}$ **or** $(r=)\frac{0.56\times0.6}{1.6}$ **or** $0.56\div2.\dot{6}$ oe		2	M1 Correct scale factor (given as a fraction or a ratio) or correct equation in *r* or a correct expression for *r*. Allow 2.6666... to 1 dp rounded or truncated
		0.21		A1 Allow 21 cm oe if units shown
				Total 4 marks

Question	Working	Answer	Mark	Notes
20	$\frac{25}{7}$ and $\frac{13}{8}$		3	M1 correct improper fractions **or** two improper fractions with a common denominator, at least one correct
	eg $\frac{200}{56}-\frac{91}{56}$ *or* $\frac{8\times25}{56}-\frac{7\times13}{56}$			M1 two correct fractions with a common denominator
	$\frac{109}{56} = 1\frac{53}{56}$ Or $\frac{109}{56}$ with RHS shown as $\frac{109}{56}$	correctly shown		A1 dep on M2 with sight of the result of the subtraction eg $\frac{109}{56}$ and $1\frac{53}{56}$ but allow showing that $1\frac{53}{56} = \frac{109}{56}$ on RHS in working
	Alternative method			
	eg $(3)\frac{32}{56}-(1)\frac{35}{56}$		3	M1 two improper fractions with a common denominator, at least one correct
	$-\frac{3}{56}$			M1 correct subtraction of fractional parts
		correctly shown		A1 dep on M2 with sight of the result of the subtraction eg $\frac{109}{56}$ or $2-\frac{3}{56}$
	Alternative method			
	eg $3\frac{32}{56}-1\frac{35}{56}$		3	M1 two correct fractions with a common denominator, at least one correct
	eg $2\frac{88}{56}-1\frac{35}{56}$			M1 complete correct method
		correctly shown		A1 dep on M2
				Total 3 marks

Question	Working	Answer	Mark	Notes
21	$\cos 52 = \frac{12.6}{x}$ **or** sin 38 = $\frac{12.6}{x}$		3	M1 Or use of tan to find horizontal side 12.6 × tan 52 or $\frac{12.6}{\tan 38}$ (=16.12...) **and** a correct first stage to find x eg $x^2 = 12.6^2 + \text{“16.12...”}^2$ or $\sin 52 = \frac{\text{"16.12..."}}{x}$ oe Allow correct first stage of sine rule
	$(x =) \frac{12.6}{\cos 52}$ **or** $\frac{12.6}{\sin 38}$ $(= \frac{12.6}{0.61566...})$ **or**			M1 Accept decimal correct to at least 3SF Or $(x =) \sqrt{12.6^2 + \text{"16.12..."}^2}$ **or** $(x =) \frac{\text{"16.12..."}}{\sin 52}$ Allow rearranged (x =) sine rule
		20.5		A1 20.4 – 20.5
				Total 3 marks

Question	Working	Answer	Mark	Notes
22 (a)	$(28+32)\times 72.6$ (= 4356) **or** 28×75 (= 2100)		4	M1 Expression for total of both classes together **or** total of class A
	$(28+32)\times 72.6-28\times 75$ (= 2256)			M1 Expression for total of class B.
	$\frac{(28+32)\times 72.6-28\times 75}{32}$ (="2256" ÷ 32)			M1 Correct calculation for mean of class B
		70.5		A1
(b)	Highest in A = 39 + 57 (= 96) Highest in B = 33 + 60 (= 93)		3	M1 for 39 + 57 (=96) **or** 33 + 60(=93)
	(39 + 57) − 33			M1 or for 33 – "96" or 33 to "96" oe
		63		A1
				Total 7 marks

23	eg $7x + 7y = 105$ − $5x + 5y =$ 75 + $7x - 5y = 3$ $7x - 5y =$ 3 $7(15 - y) - 5y = 3$ **or** $7x - 5(15 - x) = 3$ oe		3	M1 Correct method to eliminate x or y: coefficients of x or y the same **and** correct operation to eliminate selected variable (condone any one arithmetic error in multiplication) **or** writing x or y in terms of the other variable and correctly substituting
	6.5 + y = 15 **or** x + 8.5 = 15 **or** 7 × 6.5 – 5y = 3 **or** $7x - 5 \times 8.5 = 3$			M1 dep Correct method to find second variable using their value from a correct method to find first variable or for repeating above method to find second variable
		$x = 6.5$, $y = 8.5$		A1oe dep on first M1
				Total 3 marks

Question	Working	Answer	Mark	Notes
24 (a)	$\frac{2^3}{2^7}$ **or** $2^3 \times 2^{-7}$ **or** $\frac{1}{2^4}$ **or** ($\frac{1}{16}$ **and** $16 = 2^4$)		2	M1
		-4		A1 Accept 2^{-4}
(b)	$13^{-24} \times 13^5$		2	M1 for 13^{-24} or for $k = -6 \times 4 + 5$
		-19		A1 Accept 13^{-19}
				Total 4 marks

Pearson Education Limited. Registered company number 872828
with its registered office at 80 Strand, London, WC2R 0RL, United Kingdom