edexcel

Mark Scheme (Results)

January 2016

Pearson Edexcel International GCSE Mathematics B (4MB0) Paper 1R

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

January 2016
Publications Code UG043274

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.
- **Types of mark**
  - M marks: method marks
  - A marks: accuracy marks
  - B marks: unconditional accuracy marks (independent of M marks)
- **Abbreviations**
  - cao – correct answer only
  - ft – follow through
  - isw – ignore subsequent working
  - SC - special case
  - oe – or equivalent (and appropriate)
  - dep – dependent
  - indep – independent
  - eeoo – each error or omission
  - awrt –answer which rounds to

- **No working**
  If no working is shown then correct answers normally score full marks
  If no working is shown then incorrect (even though nearly correct) answers score no marks.
- **With working**
  If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
  If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.
  Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks.
  If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
  If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.
  If there is no answer on the answer line then check the working for an obvious answer.
- **Ignoring subsequent work**
  It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. Incorrect cancelling of a fraction that would otherwise be correct.
  It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.
  Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.
- **Parts of questions**
  Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

Question	Working	Answer	Mark	Notes
1	Factors of any two of 24. 180 and 504		2	M1
		2520		A1
				SC B1 for any multiple of 2520
				Total 2 marks

Question		Working	Answer	Mark	Notes
2	(a)		0.0616	1	B1
	(b)		0.062	1	B1ft
					Total 2 marks

Question		Working	Answer	Mark	Notes
3	(a)		7		B1
	(b)		19		B1
					SC part (b) Award B1 for 38 (cm) following 14 (cm) for part (a)
					Total 2 marks

Question	Working	Answer	Mark	Notes
4	$2(x^3 - 81x)$ **OR** $x(2x^2 - 162)$ or $2x(x^2 - 81)$		2	M1
		$2x(x-9)(x+9)$		A1
				Total 2 marks

Question	Working	Answer	Mark	Notes
5 (a)		3	1	B1
(b)		3	1	B1
				Total 2 marks

Question	Working	Answer	Mark	Notes
6	$\frac{13.60}{0.85}$		2	M1 oe
		16.00		A1
				Total 2 marks

Question	Working	Answer	Mark	Notes
7	$a^{\frac{1}{2}} \times a^{\frac{1}{2}} - a^{\frac{1}{2}} + a^{\frac{1}{2}} - 1$		2	M1
		a - 1		A1
				Total 2 marks

Question	Working	Answer	Mark	Notes
8 (a)		$\begin{pmatrix} 112 \\ -234 \end{pmatrix}$	1	B1
(b)		$\begin{pmatrix} -112 \\ 234 \end{pmatrix}$	1	B1ft
				Penalise missing brackets once only
				Total 2 marks

Question	Working	Answer	Mark	Notes
9		$\begin{pmatrix} 6 & -3 \\ -12 & 8 \end{pmatrix}$	2	B2 -1ee
				Total 2 marks

Question	Working	Answer	Mark	Notes
10	$6xy-12x^2+y^2-2xy-y^2$		3	M1
		$\frac{4xy-12x^2}{y-3x}$		A1
		$4x$		A1
				Total 3 marks

Question		Working	Answer	Mark	Notes
11	(a)		7.5×10^4	1	B1
	(b)	$"7.5\times10^4"\times10^{-12}$		2	M1
			7.5×10^{-8}		A1
					Total 3 marks

Question	Working	Answer	Mark	Notes
12	$36<3n$ and $3n\leq42$			M1
		13, 14		A2
				Total 3 marks

Question		Working	Answer	Mark	Notes
13	(a)		36	1	B1
	(b)	$\frac{9}{25}\times\frac{y}{99}=\frac{4}{25}$ **OR** $\frac{"36"}{100}\times\frac{y}{99}=\frac{4}{25}$		2	M1
			$y = 44$		A1
					Total 3 marks

Question		Working	Answer	Mark	Notes
14	(a)		38	1	B1
	(b)		19	1	B1
	(c)		34	1	B1
					Total 3 marks

Question		Working	Answer	Mark	Notes
15			$x+y\leq 6$	3	B1
			$x\geq 0$		B1
			$x+4y\geq 6$		B1
					Allow weak inequalities
					Total 3 marks

Question	Working	Answer	Mark	Notes
16	112 / 14 (=8)		4	M1
		72, 32		A1
	"72"−12, "32"+6, "8"+6			M1
		30 : 19 : 7		A1
				Total 4 marks

Question		Working	Answer	Mark	Notes
17	(a)(i)		$9\sqrt{24}$	2	B1 Accept 9
	(a)(ii)		$4\sqrt{24}$		B1 Accept 4
	(b)		5	1	B1
					Total 3 marks

Question		Working	Answer	Mark	Notes
18	(a)	$(\overrightarrow{OC} =)$ 4**a** **OR** $(\overrightarrow{OD} =)$ 2**b**		2	M1
			4**a** - 2**b**		A1
	(b)	$("4"\times 6)^2 + ("2"\times 5)^2$		2	M1
			26		A1
					Total 4 marks

Question	Working	Answer	Mark	Notes
19	$12.5 = \frac{k}{(2.5)^3}$		4	M1
		195.3125		A1 Accept 195 or better
	$x^3 = \frac{"195.3125"}{100}$			M1dep
		$x = 1.25$		A1 cao
				Total 4 marks

Question	Working	Answer	Mark	Notes
20	$3y - 3x = 2 + 2xy$		4	M1
	$3x + 2xy = 3y - 2$			M1dep
	$x(3 + 2y) = 3y - 2$			M1dep
		$x = \frac{3y - 2}{3 + 2y}$		A1 oe
				Total 4 marks

Question	Working	Answer	Mark	Notes
21	Lengths in the ratio 3 :4			M1
		Volumes in the ratio 27 :64		A1
	Volume of the larger sphere = $13.5\times\frac{"64"}{"27"}$			M1
		32		A1
				Total 4 marks

Question	Working	Answer	Mark	Notes
22	Vol.of a hemisphere = $\frac{2}{3}\pi r^3$ **OR** vol. of a cone = $\frac{1}{3}\pi r^2 h$			M1
	$\frac{2}{3}\pi r^3 = \frac{1}{3}\pi r^2 h$			M1
		h(cone)= $2r$		A1
		Height $r+"2r"$ = $3r$		A1 dep on 1st M1
				Total 4 marks

Question	Working	Answer	Mark	Notes
23 (a)	$-4\times 2+3k=7$ **OR** $-4\times k+(3)(-12)=-56$		2	M1
		$k=5$		A1
(b)	Attempt to factorise $2x^2+kx-12$ for c's (k)		3	M1
		$(2x-3)(x+4)$		A1
		$(2x-3)(x+4)(3x-4)$		A1
				Total 5 marks

Question	Working	Answer	Mark	Notes
24	$2(7-x)+3(2x+1)=(2x+1)(7-2x)$		6	M1
	$-2x^2+14x-x+7$			M1
		$2x^2-9x+10$		A1
	Attempt to factorise a trinomial quadratic			M1
		2, 2.5		A2
				Total 6 marks

Question	Working	Answer	Mark	Notes
25 (a)	Identifying at least one mid-class value (1, 4,8, 12.5)		3	B1
	$\frac{14\times1+24\times4+12\times8+10\times12.5}{60}$			M1
		5.52		A1
(b)	correctly drawn bars with correct widths and heights	6, 3, 2	3	B3

Question	Working	Answer	Mark	Notes
26 (a)	50^o (isosceles triangle) or ($TA = TD$)		2	B2
(b)	$\angle BAD = 95^o$ (angles on a straight line)		2	B1
	$\angle BCD = 85^o$ (opposite angles of a cyclic quad)			B1
(c)	$\angle QDA = 130^o$ (angles on a straight line)		2	B1
	$\angle DEA = 130^o$ (alternate segment)			B1
	OR			
	$\angle BDA = 35^o$ (alternate segment)			
	$\angle DBA = 50^o$ (angle sum of triangle)			
	OR			
	$\angle ABD = 50^o$ (alternate segment)			
	$\angle DEA = 130^o$ (opposite angles of a cyclic quad)			
				Total 6 marks

Question		Working	Answer	Mark	Notes
27	(a)	$\frac{180}{9} = (20)$		2	M1
			40^o		A1
	(b)	Use of sine rule		3	M1
		$\frac{x}{\sin"40"} = \frac{8}{\sin 80}$			M1
			5.22 (cm)		A1
	(c)	$\frac{1}{2} \times "5.22" \times 8 \times \sin(180 - ["40" + "80"])$		2	M1
			18.1 (cm^2)		A1
					Total 7 marks

Question		Working	Answer	Mark	Notes
28	(a)		$-3x^2 + 10x - 8$	2	B2 -1 eeoo
	(b)	$"-3x^2 + 10x - 8" = -1$		5	M1
			$3x^2 - 10x + 7$		A1
		Attempt to factorise a trinomial quadratic			M1
			(1, 0)		A2 (Accept $x = 1, \quad y = 0$)
					Total 7 marks

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