Mark Scheme (Results)

January 2019

Pearson Edexcel International GCSE

In Mathematics B (4MB1)

Paper 01

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 2019
Publications Code 4MB1_01_1901_MS

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
  - awrt – answer which rounds to
  - eeoo – each error or omission
- **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.
  If a candidate misreads a number from the question. Eg. Uses 252 instead of 255; method marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review.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.

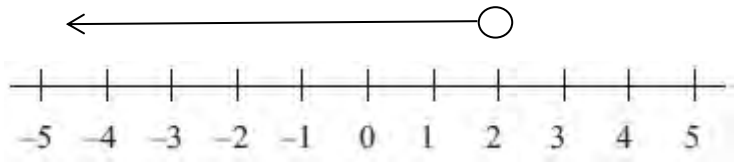
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.

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 to another.

Question	Working	Answer	Mark	Notes
1	230×1.05 or $230+0.05\times230$	241.5(0)	2	M1 A1
2		3, 18, 43	2	B2
3	$\frac{6}{15}\times80$ oe	32	2	M1 A1
4	$3xy(...+...)$ or $3y(3x^2+4xyz)$ or $3x(3xy+4y^2z)$ or $3x(3xy+4y^2z)$	$3xy(3x+4yz)$	2	M1 A1
5	$wy=8(x+1)$ oe	$x=\frac{wy}{8}-1$ or $x=\frac{wy-8}{8}$	2	M1 A1 (no isw)
6	Expression in the form mx^py^q with two of m, p or q correct	$2x^2y^4$	2	M1 A1
7	Tangent drawn at $x = 1$ (Must touch the curve. Professional judgement needed.)	5 ± 0.5	2	M1 A1

Question		Working	Answer	Mark	Notes
8	(a)	$5x + 3x < 20 - 4$ oe			M1
			$x < 2$	2	A1
	(b)	 Condone missing arrow if line extends beyond –5		1	B1 ft
9		$-\overrightarrow{OB} + \overrightarrow{OA} + \overrightarrow{AC} = \begin{pmatrix} -8 \\ 6 \end{pmatrix}$ or a right angled triangle with sides 8 and 6			M1
		$\lvert\overrightarrow{BC}\rvert = \sqrt{"-8"^2 + "6"^2}$			M1
			10	2	A1
10	(a)		3.4×10^{8}	1	B1
	(b)	0.4×10^{-11} oe			M1
			4×10^{-12}	2	A1

Question	Working	Answer	Mark	Notes
11	$2(x-...)^2+...$ $2\left(x-\frac{3}{4}\right)^2+...$ $2\left(x-\frac{3}{4}\right)^2+\frac{159}{8}$	a = 2 b = ¾ oe c = 159/8 oe	3	M1 M1 A1
12 ALT	*BC* is common *AC* = *BD* both diameters $\angle ABC=\angle DCB=90^\circ$ angles in semicircle $\angle BAC=\angle CDB$ angles in the same segment $\angle ABC=\angle DCB=90^\circ$ angles in semicircle *AC* = *BD* both diameters or *BC* is common	One correct statement 3 correct statements RHS with correct reasons given ASA with correct reasons given	3	M1 M1 A1 cao (M1) (M1) (A1cao)
13	$\frac{85}{360}\times 2\pi\times 3.6\left[=5.34\right]$ "5.34"+ 7.2	awrt 12.5	3	M1 M1 A1
14	$\angle ACB=110^\circ$ or $\angle ADE=30^\circ$ Corresponding angles (or co-interior/allied and angles on a straight line add to 180°); full reasons $180-"110"-40$ or $180-110-"40"$ angles in a triangle add up to 180° (full method)	30	3	B1 M1 A1

Question	Working	Answer	Mark	Notes
15	$1.5 \times 96 + 2.5 \times 56$			M1
		284		A1
	"284" ÷ 4 or "284" ÷ (1.5+2.5)			M1
		71	4	A1
16 (a)	360 – 24 or 180 + 156	336	1	B1
(b)	$\frac{180-84}{2} = 48$			M1
	$180 + 72 - "48"$ or $360 - 108 - "48"$ oe			M1
		204	3	A1
17	$\frac{1}{2}\pi r^2 = 2\pi$ oe			M1
	$r = 2$			A1
	$\text{Area} = 2 \times "2" \times 9$	36		M1
		SCM1 for $d = 2\sqrt{2}$, area = $2\sqrt{2} \times 9$	4	A1

Question	Working	Answer	Mark	Notes
18	$-2\times3+4\times1$ $[=2]$ or $\begin{pmatrix} a & b \\ c & d \end{pmatrix}\begin{pmatrix} -2 & -4 \\ 1 & 3 \end{pmatrix}=\begin{pmatrix} 2 & -8 \\ 1 & 2 \end{pmatrix}$ "$-\frac{1}{2}$"$\begin{pmatrix} 3 & 4 \\ -1 & -2 \end{pmatrix}$ oe set up 4 equations and find a correct value for at least one of a,b,c or d $\begin{pmatrix} 2 & -8 \\ 1 & 2 \end{pmatrix}$"$\begin{pmatrix} -\frac{3}{2} & -2 \\ \frac{1}{2} & 1 \end{pmatrix}$"oe or 3 of a,b,c and d correct	$\begin{pmatrix} -7 & -12 \\ -\frac{1}{2} & 0 \end{pmatrix}$	4	M1 M1 M1 A1
19	1200 ± 50 $\frac{1}{3}\times$ area of base $\times h$ where area of base = 38.5 ± 0.05 and $h=5.0\pm0.05$ or $\pi r^2=38.55$ $\frac{1250}{\text{Volume}}$ where the volume is calculated using r = 38.45 and h = 4.95	awrt 19.7	4	M1 M1 M1 A1

Question		Working	Answer	Mark	Notes
20		$\frac{4\ x^2-4}{2x+4}$ Use of ratio squared eg $10\times\left(\text{"}\frac{4\left(x^2-4\right)}{2x+4}\text{"}\right)^2$ $10\times\left(\text{"}\frac{4(x-2)(x+2)}{2(x+2)}\text{"}\right)^2$	$40(x-2)^2$	4	M1 M1 M1 dep 2nd M1 A1
21	(a)	Relationship between frequency and area	50, Bar drawn height 10 small squares		M1 A1
	(b)	$30+\frac{2}{3}\times 75[=80]$ $\frac{\text{"80"}}{30+75+100+155+\text{"50"}+20}\times 100$	awrt 18.6	5	M1 M1 ft A1

Question		Working	Answer	Mark	Notes
22		$x(x+7)$ oe			M1
		$x(x + 7) < 44$ or $x^2 + 7x - 44 < 0$			A1
		$(x + 11)(x - 4)$ [= 0]			M1
		$x = 4$ or -11			A1
			$0 < x < 4$	5	A1ft
23	(a)	$1 \le t < 2$			B1
	(b)	$0.5\times9 + 1.5\times8 + 2.5\times5 + 3.5\times7 + 5\times3 (= 68.5)$			M2
		M1 – for consistent value within the interval $\frac{"68.5"}{32}$			M1 dep
			awrt 2.14	5	A1
24	(a)		5.5		B1
	(b)	Allow $y > 4$ or use of set notation	$f(x) > 4$		B1
	(c)	$y - 4 = \frac{3}{x}$ or $yx = 4x + 3$			M1
		$x = \frac{3}{y-4}$			M1
			$f^{-1} : x \mapsto \frac{3}{x-4}$		A1
	(d)		$fg(x) = 4 + \frac{3}{4x-5}$ oe	6	B1

Question	Working	Answer	Mark	Notes
25 (a)	$\frac{1}{3}\times\frac{1}{2}\times 5\times 7\times 12$			M1
		70	2	A1
(b)	$AB=\sqrt{193}$ $AC=\sqrt{74}$ $BC=13$			B1
	$74=193+169-2\times\sqrt{193}\times 13\cos B$ Or $193=74+169-2\times\sqrt{74}\times 13\cos C$ Or $169=74+193-2\times\sqrt{74}\times\sqrt{193}\cos A$ oe			M1
	$\cos B=0.797...$ $\cos C=0.2235...$ $\cos A=0.410...$			M1
	$B=37.12$ $B=77.08$ $A=65.79$			A1
	$\frac{1}{2}\times\sqrt{193}\times 13\sin B$ or $\frac{1}{2}\times\sqrt{193}\times\sqrt{74}\sin A$ or $\frac{1}{2}\times\sqrt{74}\times 13\sin C$			M1
		54.5	6	A1

Question	Working	Answer	Mark	Notes
26	$x^2 = 10 - \left(\frac{5-x}{2}\right)^2$ $\quad (5-2y)^2 = 10 - y^2$			M1
	$x^2 - 2x - 3(=0)$ oe $\quad y^2 - 4y + 3(=0)$ oe	Correct 3 term quadratic		A1
	$(x-3)(x+1)$ $\quad (y-3)(y-1)$	Solving their 3 term quadratic		M1
		$x = 3$ $x = -1$		A1
	$y = \frac{5-"3"}{2}$ or $y = \frac{5-"-1"}{2}$ $\quad x = 5-"6"$ or $x = 5-"2\times 1"$			M1
		$y = 1, y = 3$	6	A1
27	One term correctly differentiated			M1
		$3x^2 - 8x + 2$		A1
	$3x^2 - 8x + 2 = 2$			M1
	$3x^2 - 8x = 0$			A1
	$x(3x-8) = 0$			M1
		$x = 0, \frac{8}{3}$	6	A1