
MATHEMATICS - MARKING SCHEME

Types of Marks**Method Marks**

Method marks are awarded for presenting a correct method of solution and attempting to apply it. There are two types of method marks: **M** marks and **(M)** marks.

- **M marks** are only awarded if method is seen.
- **(M) marks** are awarded even when a correct answer is given and no workings are shown.

Accuracy Marks

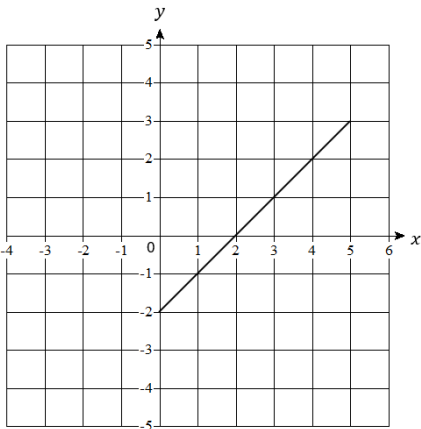
There are two types of Accuracy marks: **A** marks and **B** marks.

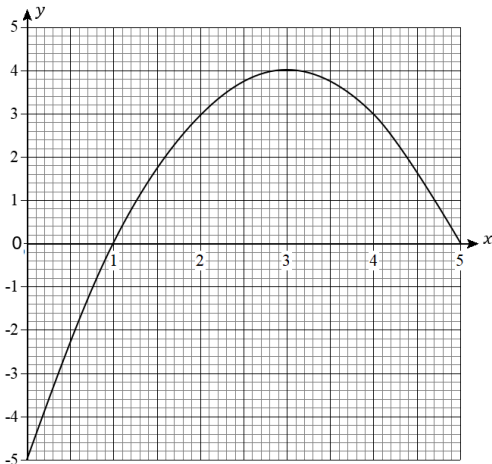
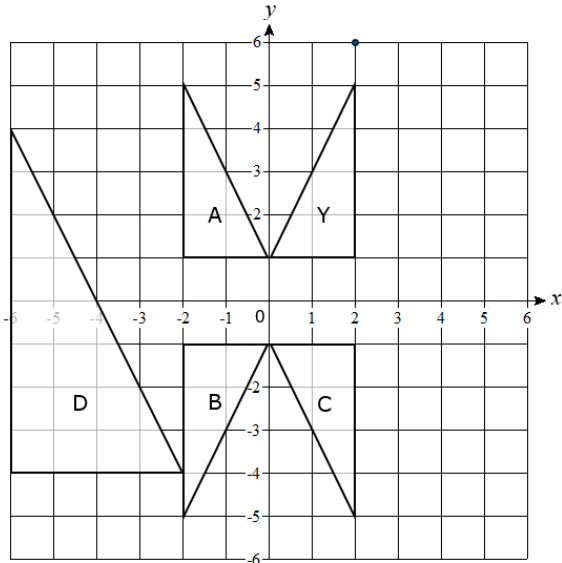
- **A** marks are accuracy marks given for correct answer only following a correct method.
Accuracy marks are also awarded for incorrect answers which are correctly followed through (f.t.) from an incorrect previous answer, provided that f.t. is indicated in the marking scheme.
- **B** marks are accuracy marks awarded for specific results or statements independent of the method used.

Marking Scheme (Total: 100 marks)

Que.		Requirements	Mark		Additional Guidance
1	(a)	$-13 + 60$ 47	(M)1 A1	4	
	(b)	2.25 , 2.828... , 2.44 , 2.142... $\frac{15}{7}$, $(1.5)^2$, 2.44 , $\sqrt{8}$	M1 A1		
2	(a)	5^4	B1	5	
	(b)	(i) 42, 40 (ii) $-2n + 52$ (iii) $-2(80) + 52$ -108	B1 B1 (M)1 A1		Both correct o.e.
3	(a)	$870\,000 - 565\,000 = 305\,000$ $\frac{305\,000}{565\,000} \times 100$ 53.9823...%	M1 M1 A1	6	Accept 54% or more accurate
	(b)	$0.03 \times 500\,000 = \text{€}15\,000$ $0.055 \times 370\,000 = \text{€}20\,350$ Total = €35 350	M1 M1 A1		
4		Price per kg of espresso coffee mixture: $\left(\frac{7}{10} \times 28.60\right) + \left(\frac{3}{10} \times 16.20\right)$ €24.88 Price for 25 kg of espresso coffee mixture: 25×24.88 €622	M1 M1 M1 (M)1 A1	5	
5	(a)	(i) $360 - (135 + 90 + 60)$ 75° (ii) $\frac{360}{60} \times 40$ 240 students	(M)1 A1 M1 A1	12	
	(b)	(i) 67 kg (ii) $\frac{67 + 70}{2}$ 68.5 kg (iii) 16 kg	B1 (M)1 A1 B1		
	(c)	$58 \times 7 = 406$ $112 \times 8 = 896$ $1302 \div 15$ 86.8 kg	M1 M1 M1 A1		

6	(a)	360°	B1	3																																		
	(b)	360 ÷ 6 = 60° 180 – 60 = 120°	(M)1 A1																																			
7	(a)	<table><tr><td colspan="2"></td><th colspan="5">Yoghurt</th></tr><tr><td colspan="2"></td><th>P</th><th>P</th><th>S</th><th>B</th><th>B</th></tr><tr><th rowspan="3">Fruit</th><th>A</th><td>(P, A)</td><td>(P, A)</td><td>(S, A)</td><td>(B, A)</td><td>(B, A)</td></tr><tr><th>A</th><td>(P, A)</td><td>(P, A)</td><td>(S, A)</td><td>(B, A)</td><td>(B, A)</td></tr><tr><th>O</th><td>(P, O)</td><td>(P, O)</td><td>(S, O)</td><td>(B, O)</td><td>(B, O)</td></tr></table>			Yoghurt							P	P	S	B	B	Fruit	A	(P, A)	(P, A)	(S, A)	(B, A)	(B, A)	A	(P, A)	(P, A)	(S, A)	(B, A)	(B, A)	O	(P, O)	(P, O)	(S, O)	(B, O)	(B, O)	B2	4	Award B1 for 8 correct entries. Accept also if fruit are listed first.
			Yoghurt																																			
			P	P	S	B	B																															
Fruit	A	(P, A)	(P, A)	(S, A)	(B, A)	(B, A)																																
	A	(P, A)	(P, A)	(S, A)	(B, A)	(B, A)																																
	O	(P, O)	(P, O)	(S, O)	(B, O)	(B, O)																																
(b)	(i) $\frac{2}{15}$ (ii) $\frac{1}{3}$	B1 B1		o.e.																																		
8	(a)	34° Angles in a semicircle OR Angles in a triangle add up to 180°	B1 M1	6																																		
	(b)	32° The angle at centre is twice the angle at the circumference	B1 M1		Accept also Equal angles in an isosceles triangle; equal radii																																	
	(c)	32° Equal angles in an isosceles triangle	A1 f.t. M1		f.t. from part (b)																																	
9	(a)	$x + 5y = 22.50$ $2x + 3y = 31$	B1 B1	6																																		
	(b)	$2x + 10y = 45$ $2x + 3y = 31$ $7y = 14$ $y = €2$ $x + 5y = 22.50$ $x + 10 = 22.50$ $x = €12.50$	M1 A1 f.t. (M)1 A1 f.t.		f.t. from (a) f.t. from (a)																																	

10	(a)	Correct plotting of point (5, 3)	B1	5	
	(b)	Correct plotting of y-intercept and drawing of straight line 	B1		
	(c)	$m = \frac{\text{change in } y}{\text{change in } x} = \frac{3 - -2}{5 - 0}$ $= 1$	(M)1 A1		
	(d)	$y = x - 2$	A1 f.t.		f.t. from (c)
11	(a)	(i) $10 - 3 \times 2$ 4 (ii) $10 - 3x = -23$ $10 + 23 = 3x$ $33 \div 3 = x$ $11 = x$	(M)1 A1 M1 A1	9	
	(b)	$x^2 + 6x - 2x - 16$ $x^2 + 4x - 16$	M2 A1		-1 e.e.o.o.
	(c)	$8x(2x^2y - 3)$	B2		B1 for correct partial factorisation
12	(a)	$px = dc - a$ $x = \frac{dc - a}{p}$	M1 A1	4	
	(b)	$4x + 11x = 36 + 9$ $15x = 45$ $x = 3$	M1 A1		

13	(a)	<table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>$-x^2$</td><td>0</td><td>-1</td><td>-4</td><td>-9</td><td>-16</td><td>-25</td></tr><tr><td>$6x$</td><td>0</td><td>6</td><td>12</td><td>18</td><td>24</td><td>30</td></tr><tr><td>-5</td><td>-5</td><td>-5</td><td>-5</td><td>-5</td><td>-5</td><td>-5</td></tr><tr><td>y</td><td>-5</td><td>0</td><td>3</td><td>4</td><td>3</td><td>0</td></tr></table>	x	0	1	2	3	4	5	$-x^2$	0	-1	-4	-9	-16	-25	$6x$	0	6	12	18	24	30	-5	-5	-5	-5	-5	-5	-5	y	-5	0	3	4	3	0	B2	7	B1 for every three correct values
	x	0	1	2	3	4	5																																	
	$-x^2$	0	-1	-4	-9	-16	-25																																	
	$6x$	0	6	12	18	24	30																																	
	-5	-5	-5	-5	-5	-5	-5																																	
y	-5	0	3	4	3	0																																		
(b)		B2 A1	B1 for every 3 coordinates correctly plotted For smooth curve Do not accept if coordinates are joined using a ruler																																					
(c)	4	B1	Accept also (3, 4)																																					
(d)	1; 5	B1	Both correct																																					
14	(a)		B1 B1	8	Correct shape Correct position																																			
	(b)		B1 B1		Correct shape Correct position																																			
	(c)		B1 B1		Correct shape Correct position																																			
	(d)		Reflection in the y -axis		B1 B1																																			

15	(a)	$\angle A = \angle P$ (given) $\angle C = \angle R$ (given) $AB = PQ$ (given) $\triangle ABC$ is congruent to $\triangle PQR$ by AAS	M1 M1 A1	8	For two statements For three statements
	(b)	$\tan 30 = \frac{40}{AC}$ $AC = \frac{40}{\tan 30}$ $AC = 69.2820... \text{ cm}$	M1 M1 A1		Accept 69 cm or more accurate
	(c)	3 rods are needed $3 \times \text{€}4.70 = \text{€}14.10$	M1 A1 f.t.		f.t. from (b)
16	(a)	(i) 4 mm (ii) $A = \pi \times 4^2 = 50.265...$ $A = 50 \text{ mm}^2$ (whole number) (iii) $V = 50.265... \times 32$ $V = 1608.495... \text{ mm}^3$	B1 M1 M1 A1 f.t.	8	f.t. from (a)(ii) Accept answers between 1600 and 1608.5 mm ³
	(b)	(i) 13 mm (ii) $V(\text{cuboid}) = 40 \times 40 \times 13$ $= 20\,800 \text{ mm}^3$ $V(\text{total}) = 1608.495... + 20\,800$ $= 22\,408.495... \text{ mm}^3$	B1 M1 M1 A1 f.t.		f.t. from (a)(iii) and (b)(i) Accept answers between 22 400 and 22 408.5 mm ³