Chhetri Academy

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GCSE MATHS

Geometry and measures

Edexcel 1MA1 | Subtopic collection Topic 42

Arcs and sectors

Foundation tier

Answers and examiner comments

5	2015-2022	Foundation
question groups	available papers	tier

Using this booklet

1. Answer numbers match the companion question booklet.
2. Follow the original question number on marking tables.
3. Examiner comments are included where available.

Name _____ **Date** _____

Some entries use full source marking material in an appendix. Any unavailable mark schemes are identified beside the relevant answer.

7	(a)		diameter	1	B1 cao
	(b)		tangent	1	B1 cao
	(c)		sector drawn	1	B1 cao

Question	Working	Answer	Mark	Notes
5 (a)		4.5	1	B1 for 4.3 to 4.7
(b)		Sector drawn	1	B1 for sector drawn
(c)		Chord	1	B1 cao

26	shown	C1 C1 C1 C1	for method to find area of semicircle, eg $\pi \times 10^2 \div 2$ (= 50π) for method to find area of quarter circle, for $\pi \times 20^2 \div 4$ (= 100π) for a complete method to find area shaded **and** area of square, eg $\pi \times 20^2 \div 4 - \pi \times 10^2 \div 2$ **and** 20×20 fully correct working leading to $\frac{\pi}{8}$	Can award first 3 marks if a value for π is used Working out to find the area of the shaded region must be shown

27	18.3	P1	for finding the area of the triangle eg $0.5 \times 8 \times 8$ (=32)	Accept rounded or truncated figures
		P1	for finding the area of the circle $\pi \times 8 \times 8$ (= 201.06..)	
		P1	for finding the area of the sector eg $\frac{1}{4} \times \pi \times 8^2$ **or** "201.06.." ÷ 4 (= 50.26...)	
		A1	for an answer in the range 18.2 to 18.3	If the answer is given within the range but then rounded incorrectly award full marks.

21	186.15	P1	for correctly finding the area of at least three sections, eg 3 of 11×7 (= 77), **or** 9×7 (= 63), **or** $\frac{1}{2} \times 11 \times 9$ (= 49.5), **or** $\frac{1}{4} \times \pi \times 7^2$ (= 38.4845..)	Note a trapezium for the rectangle and triangle should be classed as two areas. Accept figures rounded or truncated to 1 dp or better throughout.
		P1	for a method to find the number of bags required for one area or a combination of areas eg "77" ÷ 14 (= 5.5) **or** "227.9845.." ÷ 14 (= 16.2846…)	
		P1	for method to work out the total area for all four sections eg "77" + "63" + "49.5" + "38.4845…" (= 227.9845…) or adding the exact number of bags per section for all four sections eg "5.5" + "4.5" + "3.53.." + "2.74.." (= 16.28...)	This mark is dependent upon correct processes seen for all four sections.
		P1	for method to find the cost, eg integer number of bags × 10.95	integer number of bags must come from area ÷ 14 rounded up
		A1	cao	

Paper: 1MA1/2F

Question 27

Few students were able to recall the formula for either the area of a triangle or the area of a circle, and as a result could not access any marks in this question. Predictably the most common incorrect answer for the triangle was 64. Students were more successful with the area of the circle. When the formula for the area of a circle was correct, they were normally successful although some forgot to square 8, some squaring the π and then multiplying by 8. A small number of students incorrectly used 16 as their radius or failed to divide the area of the circle by 4 to give a quarter circle. The right-angled triangle confused some students who used Pythagoras in an attempt to calculate the length of the hypotenuse rather than calculate the area.

Question 21

The majority of students found this multistage problem involving area, proportion and cost challenging, with a wide range of approaches and very few fully correct responses seen. Whilst many students were able to correctly calculate the area of the rectangular sections of the composite shape, very few were able to use the appropriate formulae for the area of a triangle and a circle to find the total area. Of those that did recall the formulae correctly, some used an incorrect dimension for the triangle by using 7cm instead of 9cm and some forgot to divide the area of the circle by 4 to find the area of the quadrant. It was also common to see areas of at least one rectangle being combined with angles of 90°, 180° or 360° for the circular area.

The use of proportion to work out the number of bags needed to cover the area calculated was used correctly by some students, with many gaining a mark for finding the number of bags required to cover at least one correct area. These students often went on correctly to round the number of bags needed to an integer before multiplying by the cost of a single bag to gain another mark. A small number of students didn't round up and therefore gained no credit for finding the cost using part bags.

Students who were the most successful often showed working in a systematic way by splitting the shape into 4 sections before continuing with their calculations. It is important for students to be able to fully recall correct formulae for the areas of a number of shapes and the use of systematic working helped students work through this multistep question.