

Example Candidate Responses – Paper 1 Cambridge O Level Mathematics (Syllabus D) 4024

For examination from 2022





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Introduction

The main aim of this booklet is to exemplify standards for those teaching Cambridge O Level Mathematics (Syllabus D) 4024, and to show how different candidates' performance relate to the subject's curriculum and assessment objectives.

In this booklet candidate responses have been chosen from the June 2022 exam series to exemplify a range of answers.

For each question, the response is annotated with a clear explanation of where and why marks were awarded or omitted. In this way, it is possible for you to understand what candidates have done to gain their marks and what they could do to improve their answers.

This document provides illustrative examples of candidate work with examiner commentary. These help teachers to assess the standard required to achieve marks beyond the guidance of the mark scheme. Therefore, in some circumstances, such as where exact answers are required, there will not be much comment.

4024 June 2022 Question Paper 12 4024 June 2022 Mark Scheme 12

The questions and mark schemes used here are available to download from the School Support Hub. These files are: Past exam resources and other teaching and learning resources are available on the School Support Hub:

www.cambridgeinternational.org/support

How to use this booklet

This booklet goes through the paper one question at a time. The candidate answers are set in a table. In the left-hand column are the candidate answers, and in the right-hand column are the Examiner comments.





Exam	ple Car	ndidate	e Respo	onse 1			Examiner comments
2	Asha asks a g The table and Fruit Frequency Apple Banana Orange Melon (a) Complet (b) Write do	Apple 8 Apple 8 Control Control Con	dents about the show some of Banana 12))))))))))))))))))	eir favourite : f the results. Orange 5	rruit. Melon 7	Key: O represents 4 people [3]	 The candidate uses the key correctly to complete the missing frequencies and the row for 'Apple'. Candidates often found it a challenge to represent 5 oranges correctly. Here they use a half-circle instead of a quarter-circle. Mark for (a) = 2 out of 3 Many candidates understand that the mode is the most common item, but select the frequency, 12, instead of the item, banana. Mark for (b) = 0 out of 1
							2 out of 4



Example Candidate Response 2



A and B are vertices of a quadrilateral. Line L is the line of symmetry of the quadrilateral.

Find the coordinates of the other two vertices of the quadrilateral.

Examiner comments

1 The candidate is awarded B1 for one correct coordinate pair. The coordinates (4, 3) should be (4, 2). They do not draw the quadrilateral on the grid, which would have shown that their reflection of point B was incorrect.

Total mark awarded = 1 out of 2













Example Candidate Response 2



Examiner comments



Example Candidate Response 2



Examiner comments

1 Some candidates could not recall the correct formula for the sum of angles in a polygon. This candidate finds the angle sum correctly as 540° and is awarded M1 for this. They also find the sum of the given angles as 395°, but do not use this to reach their answer. Their answer of 108° is the interior angle of a regular polygon.

Total mark awarded = 1 out of 3





 (c) Shani has 100 counters.
 [2]
 7/

 She uses some of the counters to make Pattern 20.
 N

 She uses all the remaining counters to make Pattern k.
 N

 Find the value of k.
 N

 $\frac{76}{38}$ 62 combers to make Pattern 20 Pattern K will have 38 counterns so the value of h. will k = 12 $k = \frac{12}{12}$ [3]

Examiner comments

1 Most candidates could identify that the numbers in the sequence were increasing by 3 each time. This candidate uses this difference to write an incorrect expression for the n^{th} term.

Mark for (a) = 1 out of 1

29 3.2

Mark for (b) = 0 out of 2

2 Some candidates answered this part by continuing the values in the table up to the 20th pattern as is seen here. They identify that there are 62 counters in pattern 20 which leaves 38 counters remaining. They then use their continuation of the table to identify that pattern 12 has 38 counters. This approach leads to the correct answer despite the incorrect expression in part (b).

Mark for (c) = 3 out of 3

Total mark awarded = 4 out of 6

Example Candidate Response 1Examin10 A bag contains red balls, blue balls and green balls.
The ratio green : blue = 3 : 8.
The ratio green : blue = 2 : 5.
Work out the fraction of the balls that are blue.1 The
that they
parts of the
find the or
in the ball
common
reach the
and are at
their ans
fraction of
 $40 \div (15)$ Total mag
2 out of

Examiner comments

1 The candidate understands that they need to equate the blue parts of the two given ratios to find the ratio red : blue : green in the bag. They use the lowest common multiple of 8 and 5 to reach the correct ratio 15 : 40 : 16and are awarded B2. To complete their answer, they need to find the fraction of blue balls in the bag using $40 \div (15 + 40 + 16)$.

Total mark awarded = 2 out of 3

Examiner comments

Example Candidate Response 2



Examiner comments

1 In part (a), candidates are required to show the construction arcs for their bisector. Here, the first arc has a small radius, but the resulting bisector is sufficiently accurate.

Mark for (a) = 2 out of 2

2 This candidate identifies the correct side of the bisector to give the required region for part (b). However, their shading is incomplete because it does not include the region inside their arc. This is a common error, particularly when a small arc is used for the construction in part (a).

Mark for (b) = 0 out of 1

Total mark awarded = 2 out of 3



Example Candidate Response 2



Examiner comments

1 It is common to see confusion between significant figures and decimal places. Here, the candidate has rounded to 3 decimal places, rather than to 3 significant figures.

Mark for (a) = 0 out of 1

2 The question requires all numbers to be written correct to 1 significant figure. It is common for candidates to round 63.7 to the nearest integer, 64, rather than to 60 as required. The mark scheme awards B1 for 4 and 0.4 seen

Mark for (b) = 1 out of 2

Total mark awarded = 1 out of 3



Example Candidate Response 1 Examiner comments (a) Write these numbers in order of size, starting with the smallest. 2×10^{-4} 2×10^{-2} 2000 0.002 2000 0.002 0.000z 0.02 2×10^{-4} 0.002 2×10^{-2} 2000....[1] smallest (b) This is a calculation using numbers in standard form. -7-9 :.16 107 + + 109 $a \times 10^{-7} \div 5 \times 10^{b} = 4 \times 10^{-16}$ Find the value of a and the value of b. = 10-16 ax 10-7 = 5x10 = \$4 × 10-16 6=9 ax 10-7: 5x 10 = 4x10-16 20 x 10-7 ax 10-7 = 4x 10-16 x 5x 109 15× 109 = 4 × 10"6 ax101 : 20x10 a=20 1 The question states that the numbers are in standard form so a *b* =[2] must be in the range $1 \le a < 10$. This is a common answer and leads to a correct calculation of $20 \times$ $10^{-7} \div 5 \times 10^9 = 4 \times 10^{-16}$, however 20×10^{-7} is not in standard form, so a = 20, b = 9 does not meet the requirements of the question. The mark scheme awards SC1 for answers a = 20 and b = 9Mark for (a) = 1 out of 1 Mark for (b) = 1 out of 2 Total mark awarded = 2 out of 3



Example Candidate Response 1



Examiner comments

The candidate sets up an equation relating x and y correctly. Some candidates use the incorrect order of operations when evaluating the bracket: here they square each term before subtracting, leading to an incorrect value of k.

2 The method mark is awarded because the candidate shows their value of k and x = -2 substituted correctly into their starting equation.

Total mark awarded = 1 out of 2

1 out of 2

Example Candidate Response 2 Examiner comments $\sqrt{215}$ y is directly proportional to $(x-1)^2$. When x = 5, y = 32. = K y = 2'(-2) Find the value of y when x = -2. $y = K(n-l)^{2} \qquad \frac{3z}{168} \frac{x^{2}}{168} \frac{x^{2}}{168}$ The candidate sets up an equation relating x and y and finds the constant of proportionality $32 = K \left(5^2 + (-1)^2 - 2ab \right)$ correctly as 2, so they are awarded 32 = K(25+1-2(5)(1))B1. In their next step, they use this value of k, but the incorrect $y = \frac{-4}{2}$ [2] 32 = K(26 - 10)relationship of y = kx in place of y = $k(x-1)^2$. 32 = K(16)Total mark awarded =

Example Candidate Response 1



Examiner comments

1 The candidate draws an acceptable tangent to the curve at x=-1 and indicates two correct pairs of coordinates on their tangent.

2 It is common to see errors in the calculation of the gradient. Here, the candidate uses (-0.7 - 7) in the numerator rather than (0.7 - 7).

Mark for (a) = 1 out of 2

3 The candidate correctly draws the line y = 2 on the graph and finds the *x*-coordinates of the points of intersection to give the solutions. It is common to see errors when reading these values and the candidate's value of x = -4 is inaccurate.

Mark for (b) = 2 out of 3

Total mark awarded = 3 out of 5



Example Candidate Response 1



Examiner comments

1 This candidate sketches the quadrilaterals which helps them to identify square and rhombus as the only two satisfying both conditions.

Mark for (a) = 1 out of 1

2 Candidates often attempt to pair up sides and angles from the two triangles. Here, the candidate states a correct pair of sides and a correct pair of angles with correct reasons. The pair CX = DX cannot be found from the given information as X is given as the midpoint of AB but not of CD.

3 The candidate does not use the information given in the question that AC is parallel to DB, which leads to a second pair of angles.

• Candidates rarely state a congruence condition to complete their answer. In this case, the candidate does state the condition *SAS*, but this cannot be used to show congruence with the information given about these triangles.

Mark for (b) = 2 out of 3

Total mark awarded = 3 out of 4

Example Candidate Response 2	Examiner comments
17 (a) Ryan says:	
Each diagonal of quadrilateral Q divides it into two congruent isosceles triangles.	
Draw a ring around each of the quadrilaterals in the list for which Ryan's statement is always true.	
Square Rectangle Rhombus Parallelogram Trapezium (Kite) [1]	Mark for (a) = 0 out of 1
(b)	
A SCALE	
C	
AXB and CXD are straight lines.	
X is the midpoint of AB. AC is parallel to DB.	
Show that triangle AXC is congruent to triangle BXD.	
Give a reason for each statement you make.	
AXC = BXO Calternating angles)	I he correct reason for this pair of angles is 'vertically opposite'.
BDX = ACX C. 90 right angles 2	2 The correct reason for this pair
CAX = DBX	of angles is 'alternate angles'. No
Usixia	information about the sizes of the angles is given, so 90° is incorrect.
	3 It is common for candidates
	to show that triangles are similar when they are required to show they
	are congruent. Here the candidate
	states three pairs of equal angles
	shows the triangles are similar.
	They need to state at least one
	pair of equal sides to show they are congruent. The candidate is
	awarded B1 for two appropriate
	pairs with incorrect reasons.
	Mark for (b) = 1 out of 3
	Total mark awarded =
	1 out of 4















Examiner comments

Question 23



Example Candidate Response 2



24 (a) Solve $\frac{2-5x}{3x+10} = 3$. $3(3x+10)$ $\alpha_{22} + 30$	
2-5 = 9 = 9 = + 3 = -2 = 7 = -3 = -3 = -3 = -3 = -3 = -3 = -3	Mark for (a) = 3 out of 3 It is common for candidates o omit stages of working. This candidate uses the correct common lenominator when combining the ractions, but does not show a correct numerator at any stage. The candidate shows the correct two barts of the numerator separately, but adds them rather than subtracts. Mark for (b) = 1 out of 3
4 0	out of 6

Example Candidate Response 2



Examiner comments

1 This candidate eliminates the fraction and expands the brackets correctly.

2 It is common for candidates to omit negative signs when rearranging and x = 2 is a common incorrect answer in this part. The error is in this line which should be 14x = -28 leading to x = -2.

Mark for (a) = 1 out of 3

3 This candidate shows a correct numerator before expanding incorrectly. In the next line -10 should be +10. They are given marks for the correct numerator seen.

4 The denominator is seen correctly earlier in the working, but is copied incorrectly at this stage leading to an incorrect denominator in the final answer. Candidates should check their work for this type of transcription error.

Mark for (b) = 2 out of 3

Total mark awarded = 3 out of 6



Example Candidate Response 2



Examiner comments

Cambridge Assessment International Education The Triangle Building, Shaftesbury Road, Cambridge, CB2 8EA, United Kingdom t: +44 1223 553554 e: info@cambridgeinternational.org www.cambridgeinternational.org