Qualification Accredited

OCR
Oxford Cambridge and RSA

GCSE (9–1)

Exemplar Candidate Work

MATHEMATICS

J560
For first teaching in 2015

J560/05

Summer 2017 examination series

Version 1

Contents

Introduction

These exemplar answers have been chosen from the summer 2017 examination series.

OCR is open to a wide variety of approaches and all answers are considered on their merits. These exemplars, therefore, should not be seen as the only way to answer questions but do illustrate how the mark scheme has been applied.

Please always refer to the specification (http://www.ocr.org.uk/Images/168982-specification-gcse-mathematics-j560.pdf) for full details of the assessment for this qualification. These exemplar answers should also be read in conjunction with the sample assessment materials and the June 2017 Examiners' Report to Centres available on the OCR website http://www.ocr.org.uk/qualifications/.

The question paper, mark scheme and any resource booklet(s) will be available on the OCR website from summer 2018. Until then, they are available on OCR Interchange (school exams officers will have a login for this).

It is important to note that approaches to question setting and marking will remain consistent. At the same time OCR reviews all its qualifications annually and may make small adjustments to improve the performance of its assessments. We will let you know of any substantive changes.

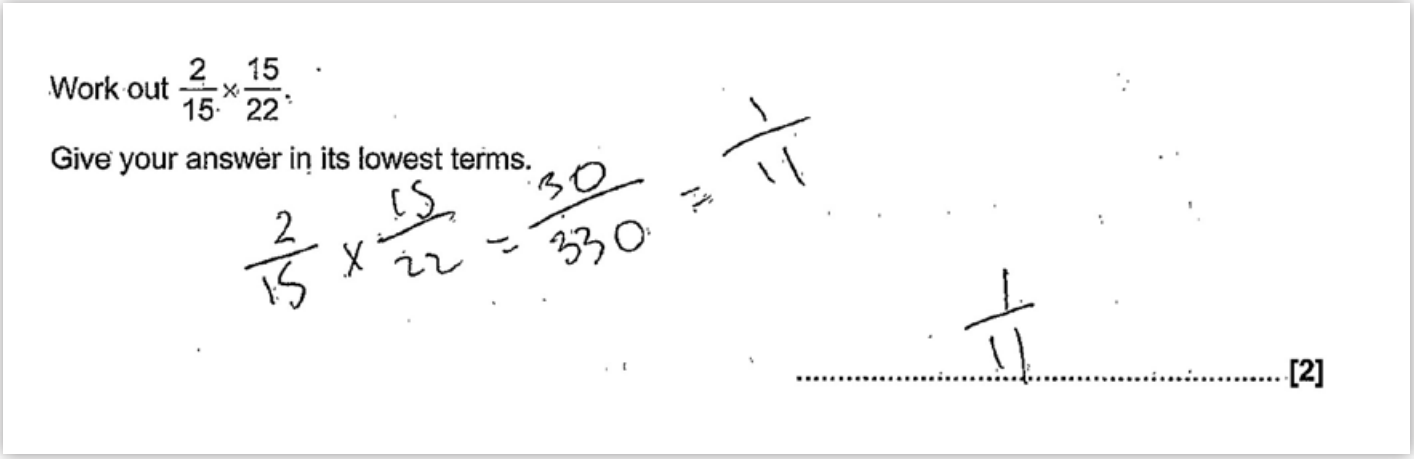
Question 1

Work out $\frac{2}{15} \times \frac{15}{22}$.

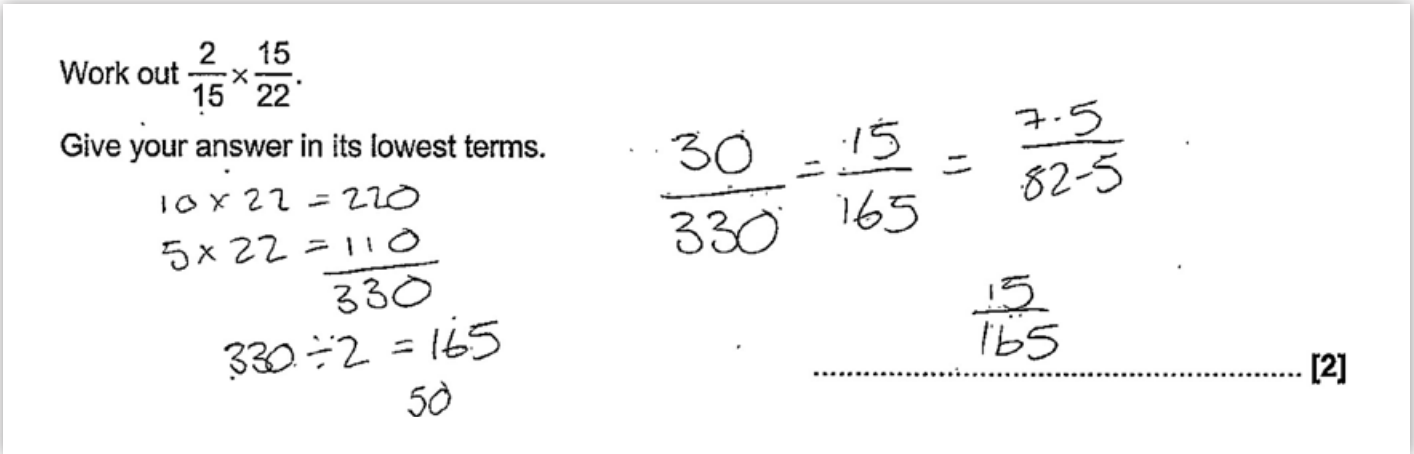
Give your answer in its lowest terms.

..... [2]

Exemplar 1 – Mark(s): 2



Exemplar 2 – Mark(s): 1

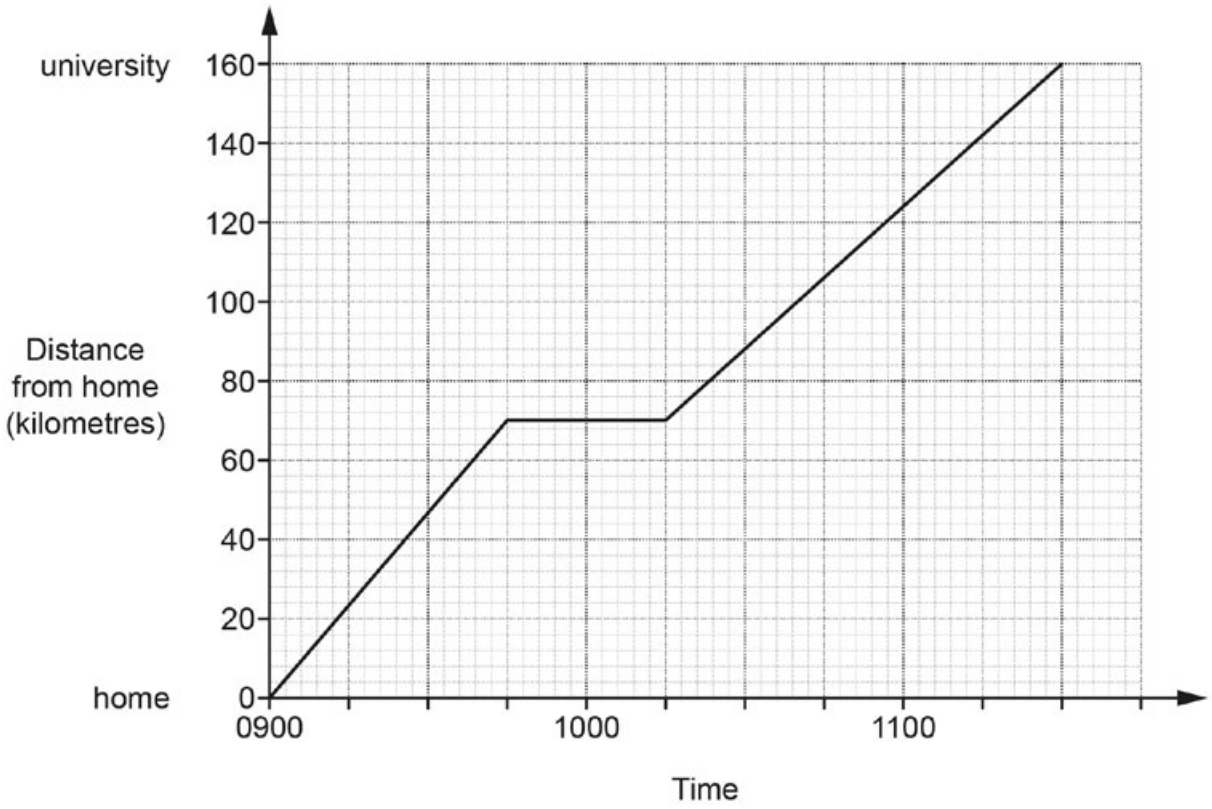


Examiner commentary

The most efficient way of tackling this problem without a calculator would be to cancel any common factors before multiplying. Neither candidate uses this approach, preferring to multiply first and then cancel later. Both candidates correctly reach $\frac{30}{330}$ but the second candidate makes errors in cancelling by incorrectly dividing by 2 and so only scores M1 on the mark scheme. The first candidate recognises 30 is the highest common factor and goes on to reach the correct final answer for 2 marks.

Question 2

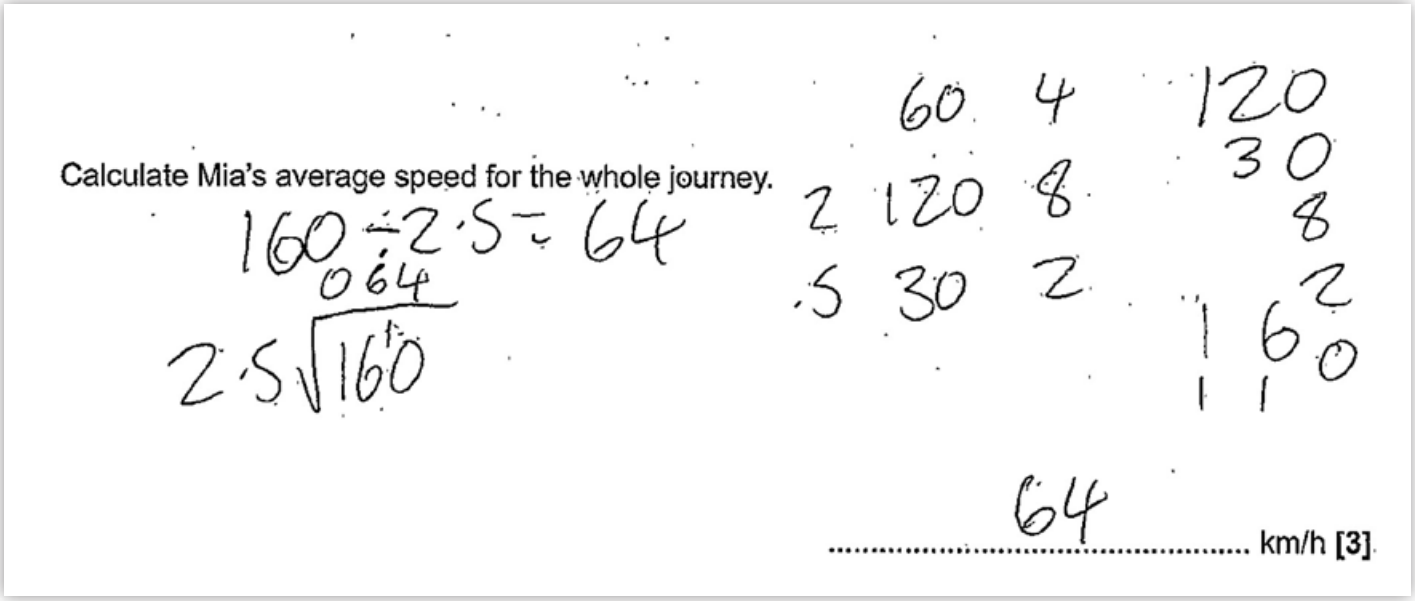
The graph shows Mia's journey from her home to university.



Calculate Mia's average speed for the whole journey.

..... km/h **[3]**

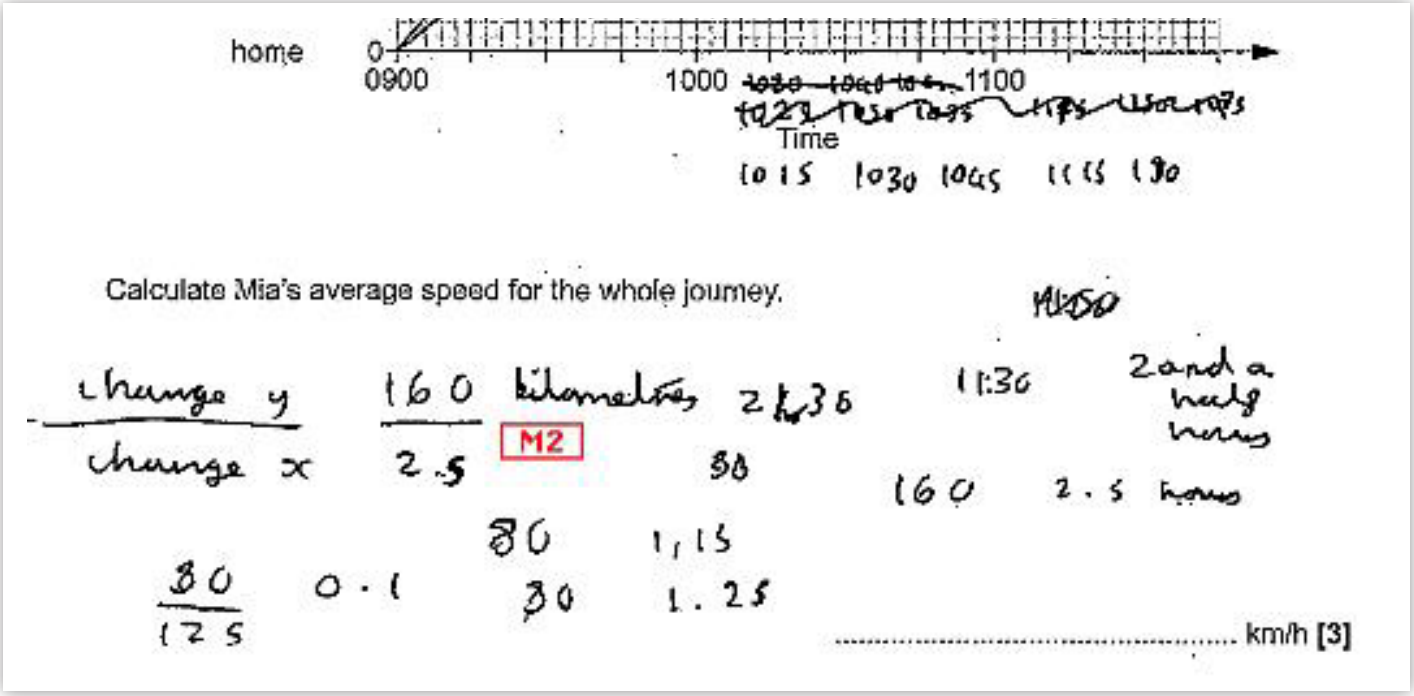
Exemplar 1 – Mark(s): 3



Examiner commentary

Very clear response giving the correct answer and also showing all relevant working. Scores all 3 marks.

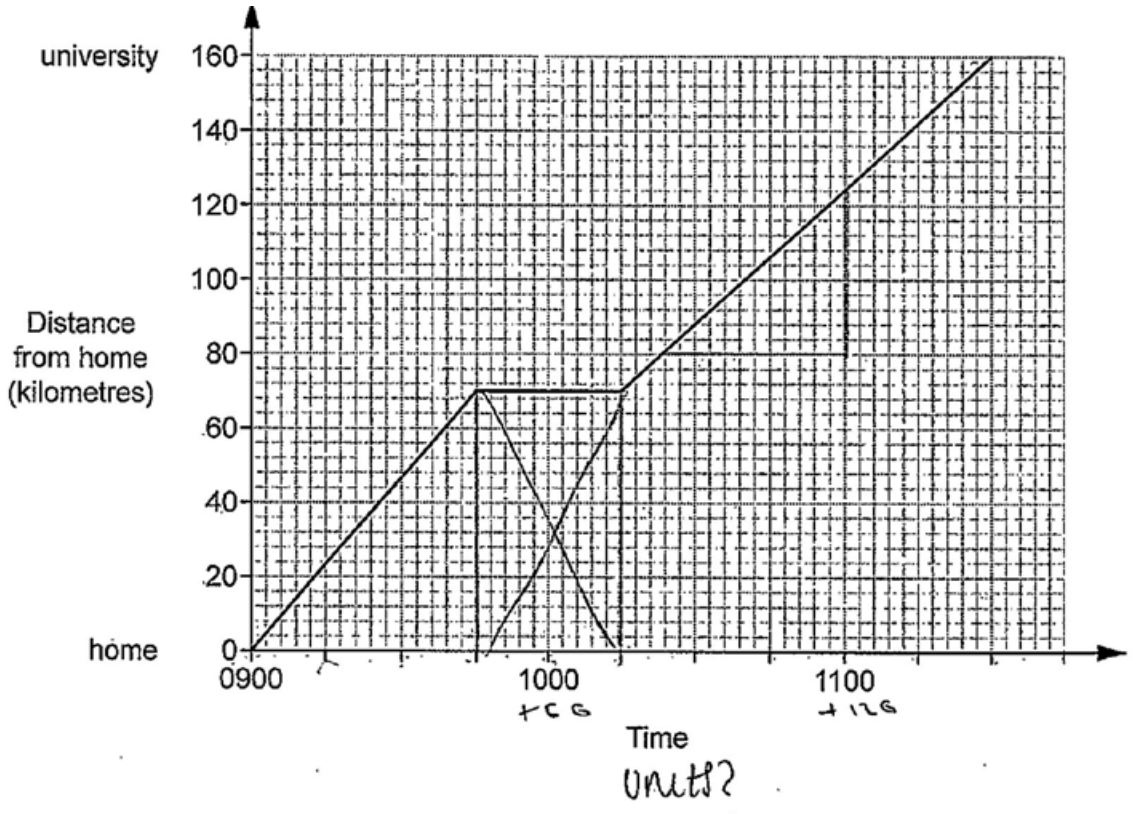
Exemplar 2 – Mark(s): 2



Examiner commentary

This candidate shows the correct distance and the correct time and the intention to divide which earns M2 for 160 ÷ 2.5. They are unable to complete the division to reach the correct answer.

Exemplar 3 – Mark(s): 1



Calculate Mia's average speed for the whole journey.

$s = d \div t$

160 ÷ 1250

120 minutes

160 ÷ 2 hour = 80

M1

80 km/h **[3]**

Examiner commentary

The candidate has the correct distance of 160 but uses an incorrect time interval of 2 hours (from removing the time period that Mia stopped for). The mark scheme allows M1 for 160 divided by their time interval where the time is in the range 2 to 3 hours.

Question 3

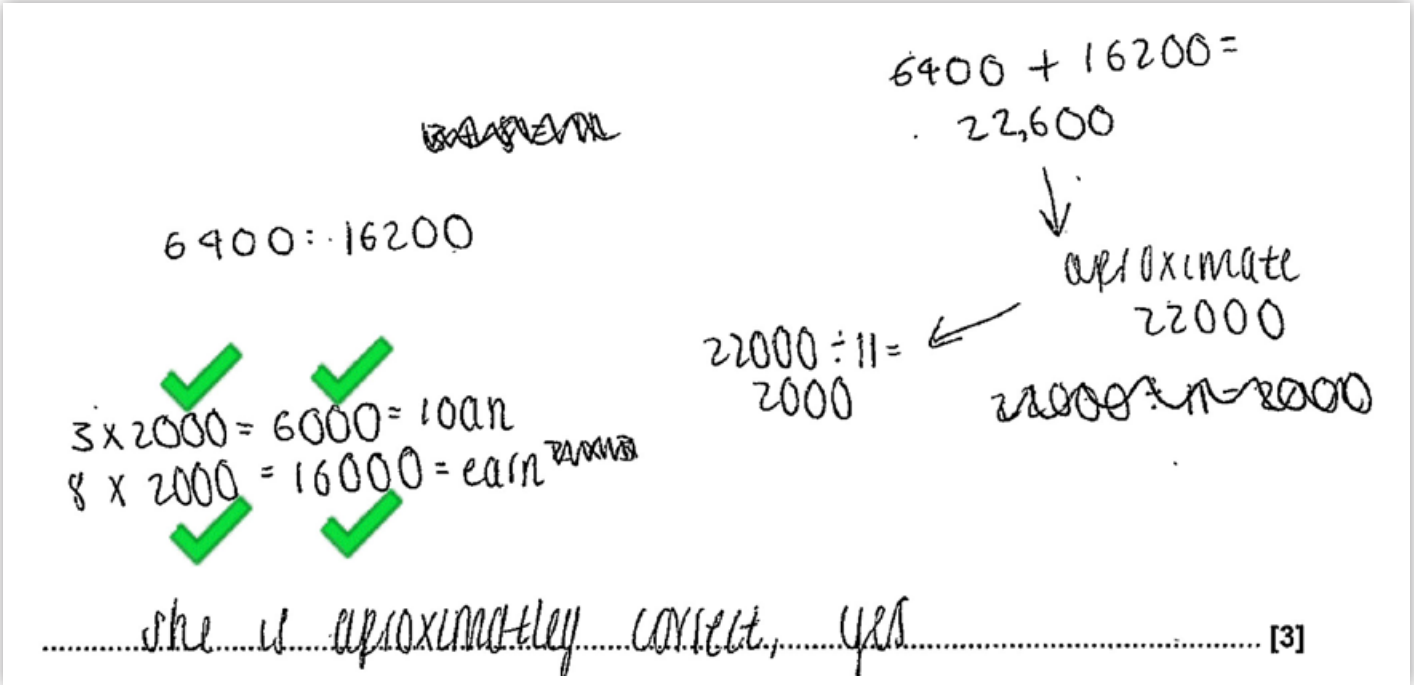
Last year, Katie earned £16 200.
Her total loan repayments were £6400.

Katie estimates that the ratio of her loan repayments to her earnings is approximately 3 : 8.

Is she correct?
Show your reasoning.

..... [3]

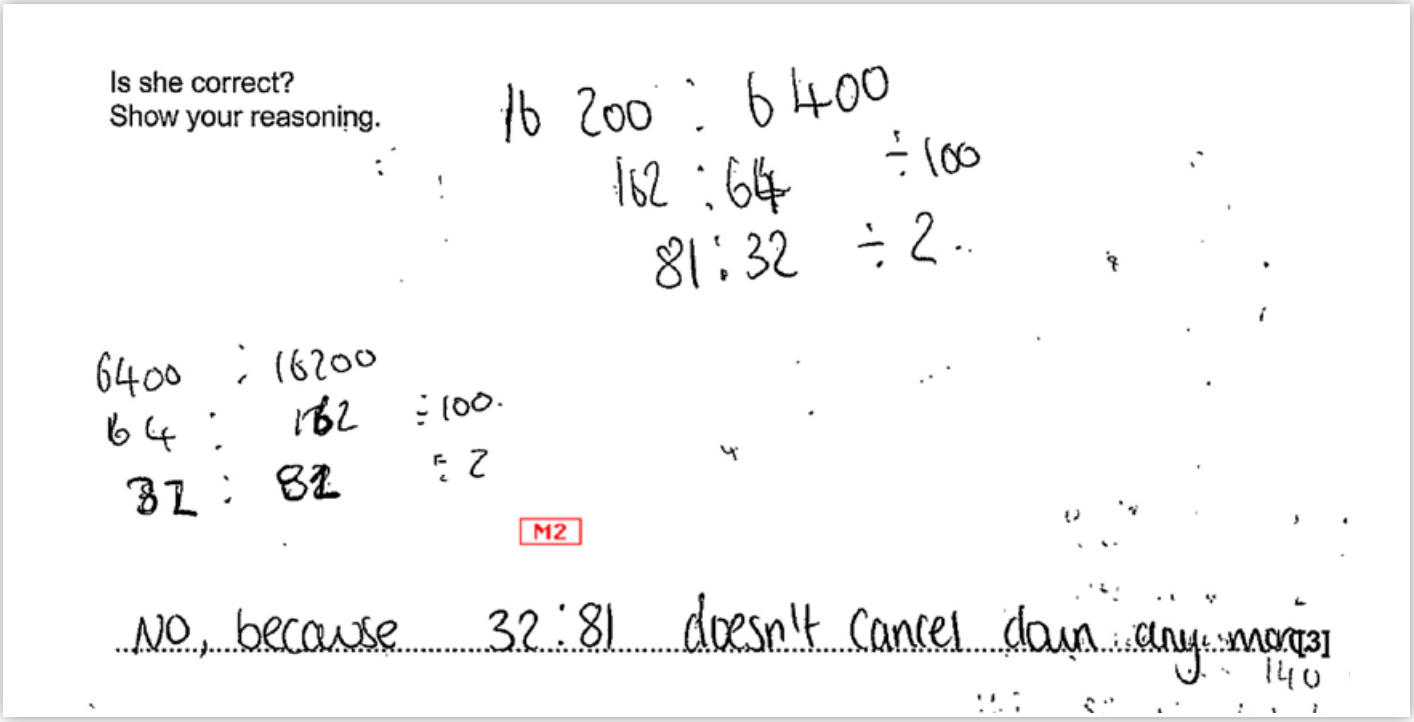
Exemplar 1 – Mark(s): 3



Examiner commentary

There were many ways of approaching this problem and the mark scheme details four possible methods A, B, C and D. In this case, the candidate is using method A and rounds 22 600 to 22 000 before dividing by 11. They then show that 3 parts are approximately 6000 and 8 parts are approximately 16 000 before drawing a correct conclusion. This is a variation of method A but perfectly valid for 3 marks.

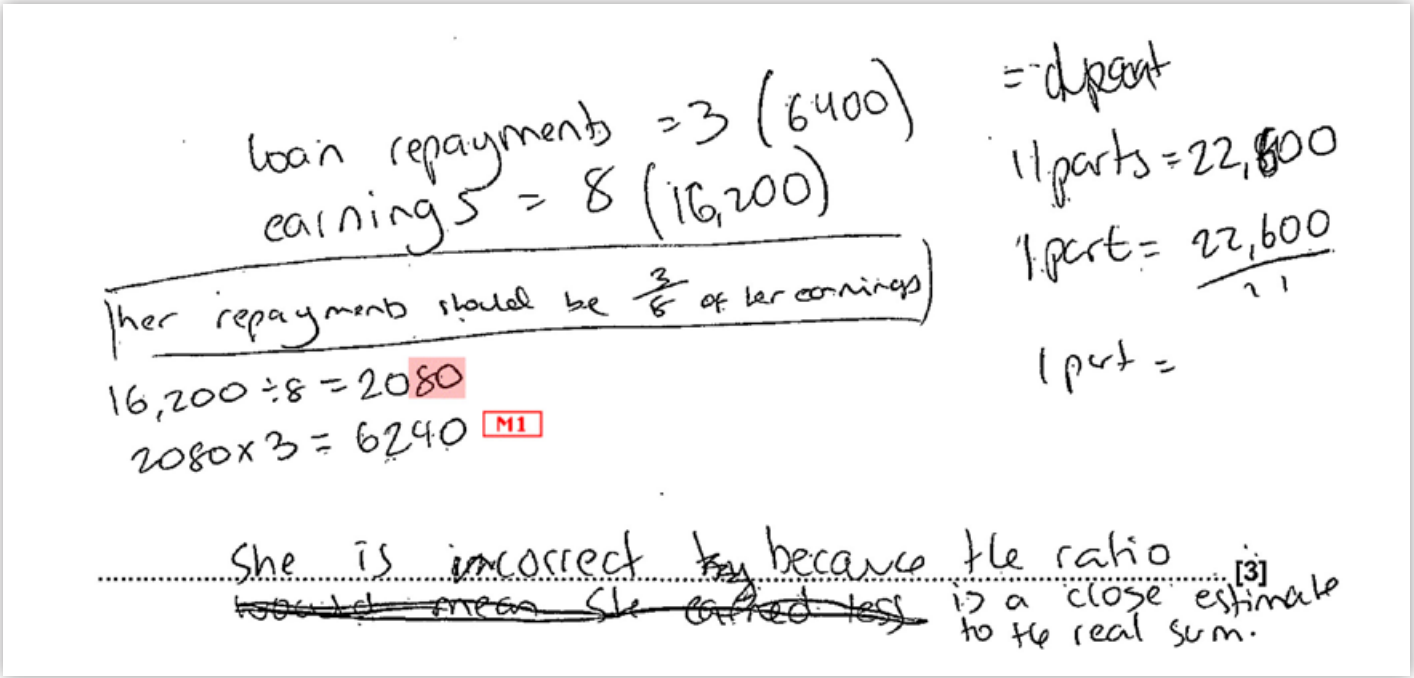
Exemplar 2 – Mark(s): 2



Examiner commentary

This candidate is using the method B approach and cancels down the ratio of the two values 16 200 : 6400 to reach 81 : 32. This is sufficient for M2 and we can ignore incorrect subsequent working (isw on mark scheme). The 3 marks are not earned as the conclusion is incorrect.

Exemplar 3 – Mark(s): 1



Examiner commentary

This candidate is using method C and attempting to find $\frac{3}{8}$ of 16 200 to compare with 6400.

They earn M1 for the intention to find $\frac{3}{8}$ of 16 200 but are unable to carry out the calculation accurately and no further marks are scored as a consequence.

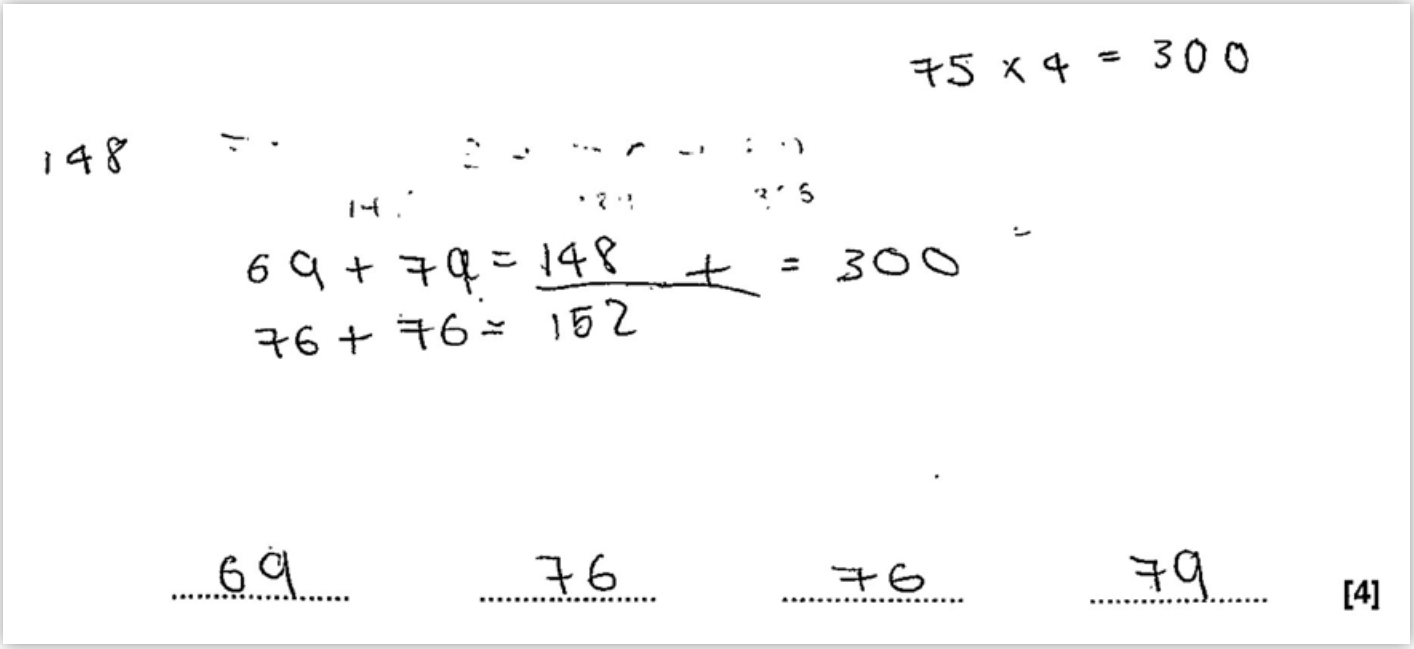
Question 6

Jenny played four games of golf.
For these games her modal score was 76 and her mean score was 75.
Her range of scores was 10.

What were her scores for the four games?

.... [4]

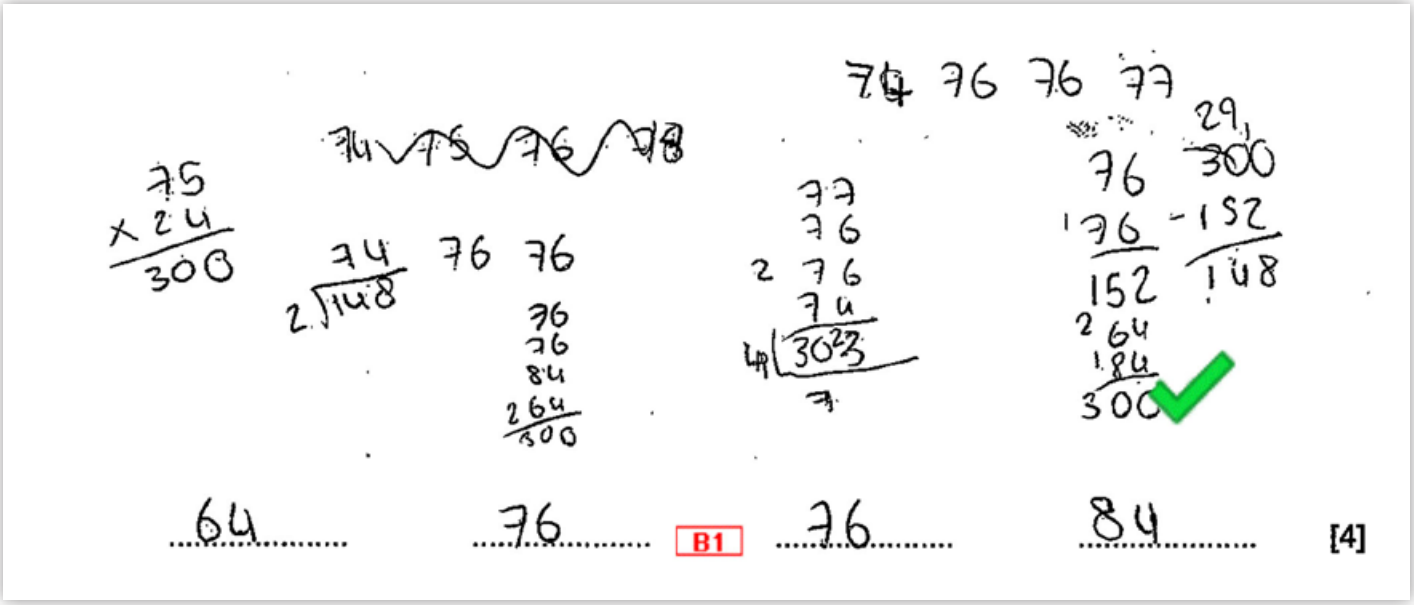
Exemplar 1 – Mark(s): 4



Examiner commentary

Four correct values, gets 4 marks.

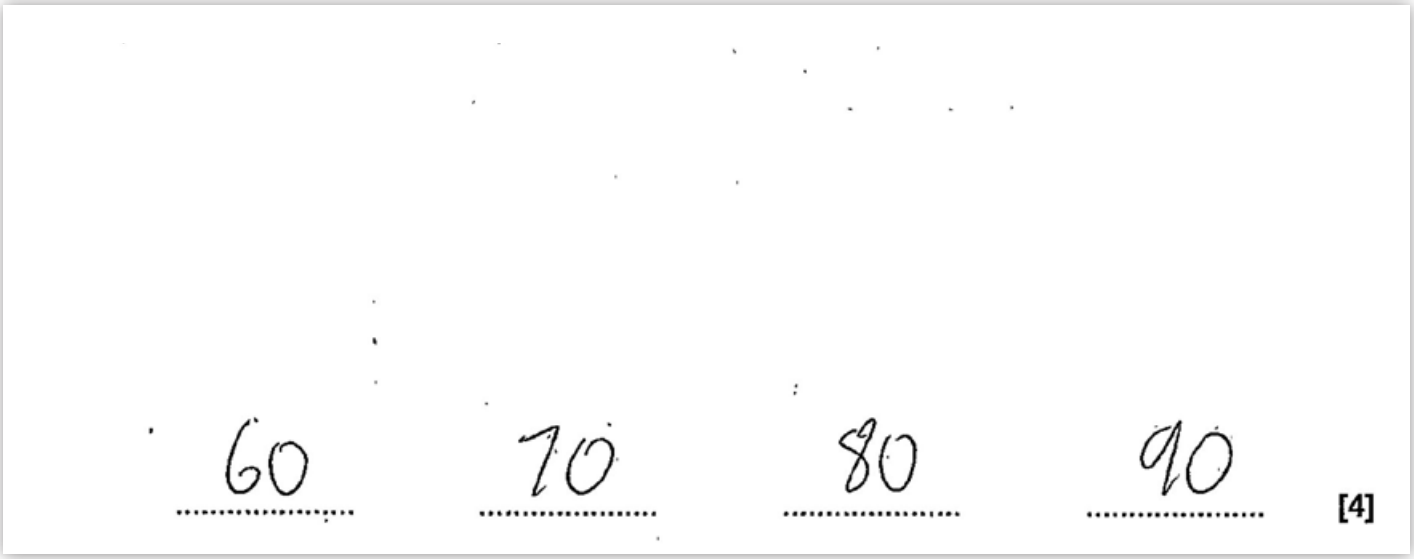
Exemplar 2 – Mark(s): 2



Examiner commentary

This candidate gives at least 2 values with a mode of 76 and shows the sum of the 4 values is 300 in working and on the answer line. B1 B1 is scored for each of these conditions.

Exemplar 3 – Mark(s): 1

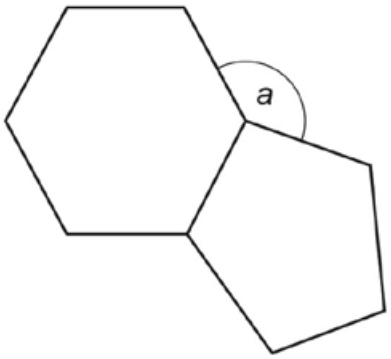


Examiner commentary

No working shown just 4 incorrect values. We can however imply from these 4 values that the sum of them is 300 and thus can award B1 for 300 soi (seen or implied).

Question 8(a)

Imran joins two tiles together as shown below.
One tile is a regular hexagon and the other tile is a regular pentagon.



Not to scale

(a) Show that angle *a* is 132°.

.....

.....

..... **[3]**

Exemplar 1 – Mark(s): 3

Not to scale

(a) Show that angle *a* is 132°.

4×180 = 720/6 = 120

(n-2) 180 = interior total = (6-2) 180 = 6×180 = 1080

(5-2) 180 = 3×180 = 540 = 108

exterior for pentagon = 72

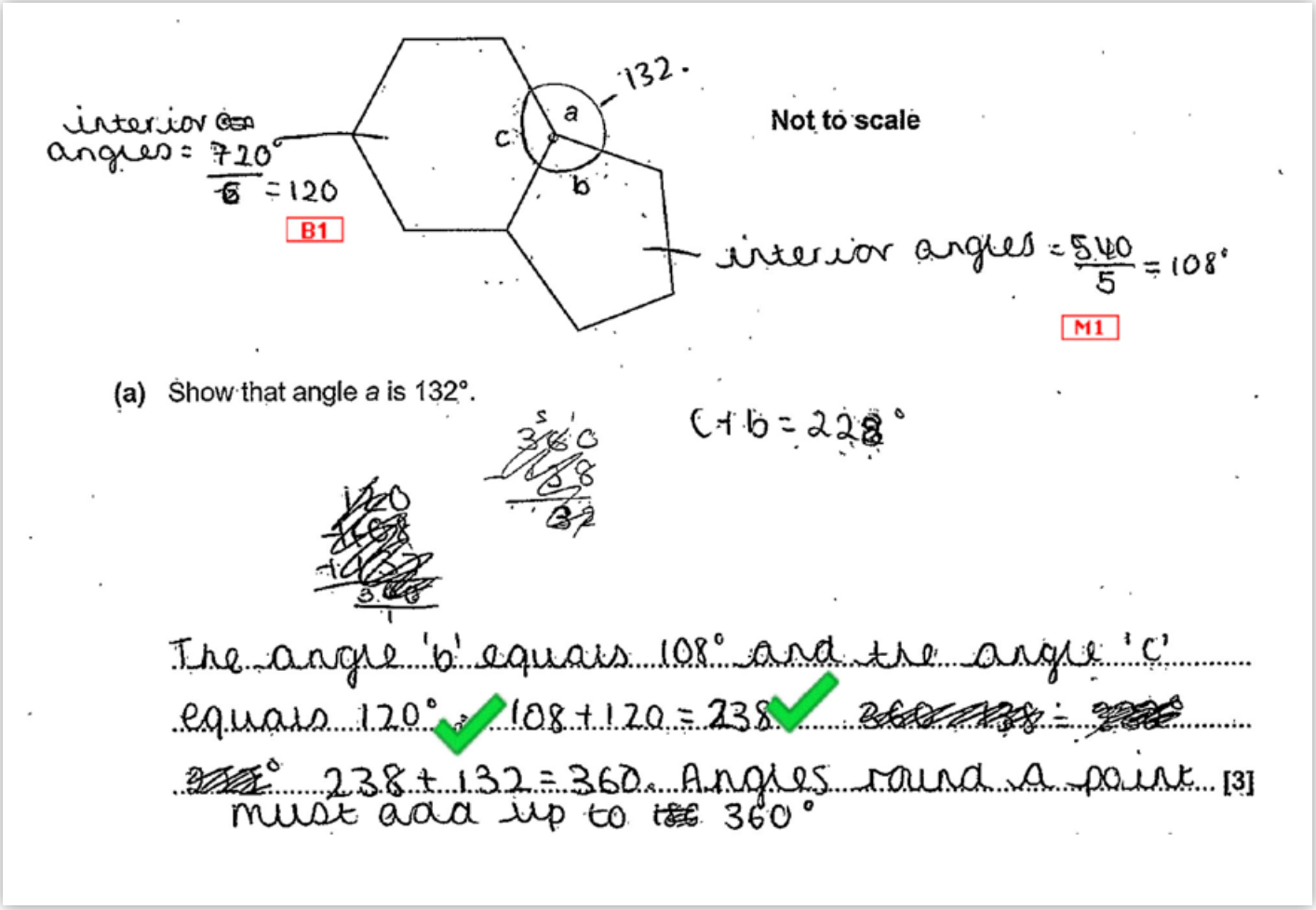
exterior for hexagon = 60

72+60 = 132° [3]

Examiner commentary

In a 'Show that' question, it is important that candidates show each step of their working and obtain the answer given with no omissions or errors. This candidate clearly uses interior angles of a hexagon and pentagon, establishing the angle sums and then finding one interior angle of each. They then find the exterior angle of each and show that the sum of these is 132. There is no confusion between interior and exterior angles and the annotation on the diagram confirms this so 3 marks are awarded.

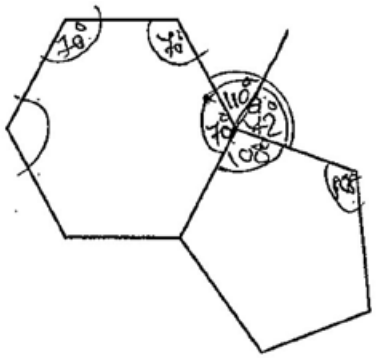
Exemplar 2 – Mark(s): 2



Examiner commentary

This candidate correctly obtains the interior angles of the hexagon and pentagon with the mark scheme allowing both 540 ÷ 5 and 720 ÷ 6 as minimal working for M1. B1 is scored for either 120 or 108 obtained provided there is no ambiguity with exterior angles (nfww – not from wrong working). There is an error however in the conclusion where 108 + 120 238 which prevents the award of the final mark.

Exemplar 3 – Mark(s): 2



Not to scale

$\frac{720}{6} = 120$

$6 \times 180 = 720$

$3 \times 180 = 540$

B1

$\frac{540}{5} = 108$

(a) Show that angle *a* is 132°.

.....

.....

..... [3]

Examiner commentary

This candidate earns M1 for 720 ÷ 6 and 540 ÷ 5 and there is no ambiguity with exterior and interior angles. They also earn B1 for the value 108 shown correctly. The final mark cannot be earned as there is an error in the evaluation of 720 ÷ 6.

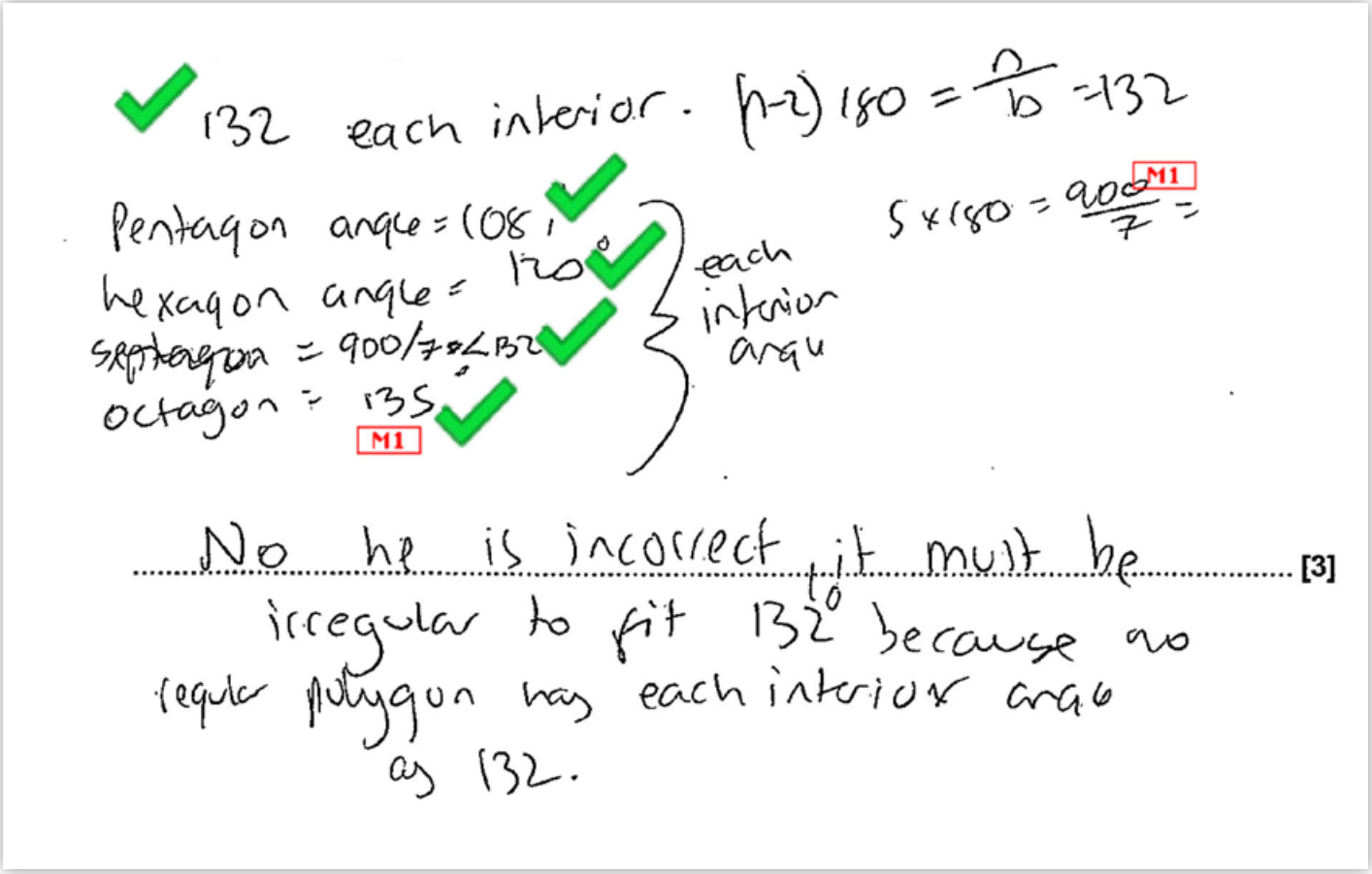
Question 8(b)

Imran thinks that another tile in the shape of a regular polygon will fit **exactly** into angle *a*.

Is Imran correct?
Show your reasoning.

..... [3]

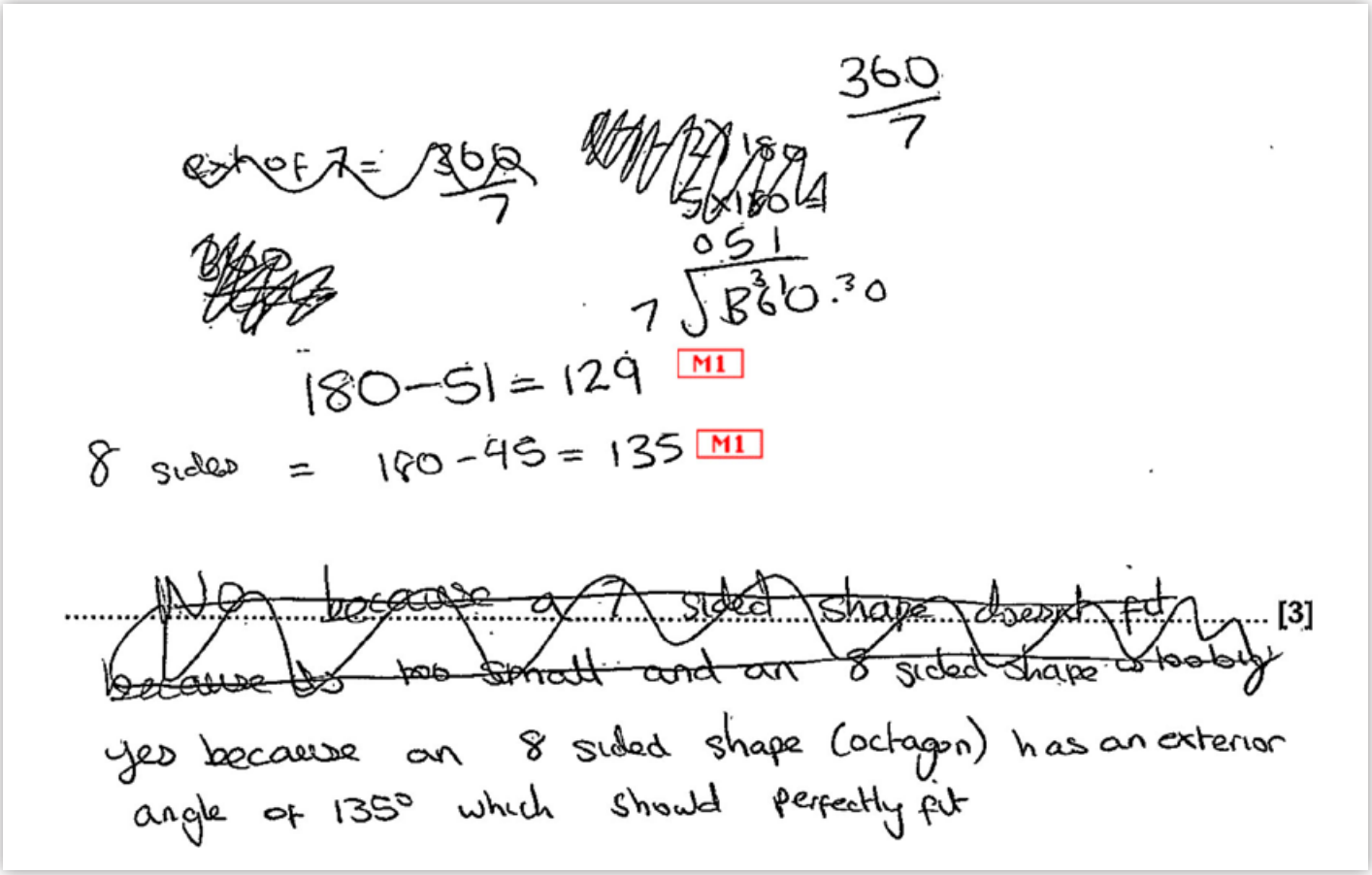
Exemplar 1 – Mark(s): 3



Examiner commentary

This candidate uses interior angles and correctly shows interior angle of octagon = 135°. They show the correct method to work out interior angle of heptagon and states that $\frac{900}{7}$ is less than 132. A correct conclusion with working so 3 marks scored.

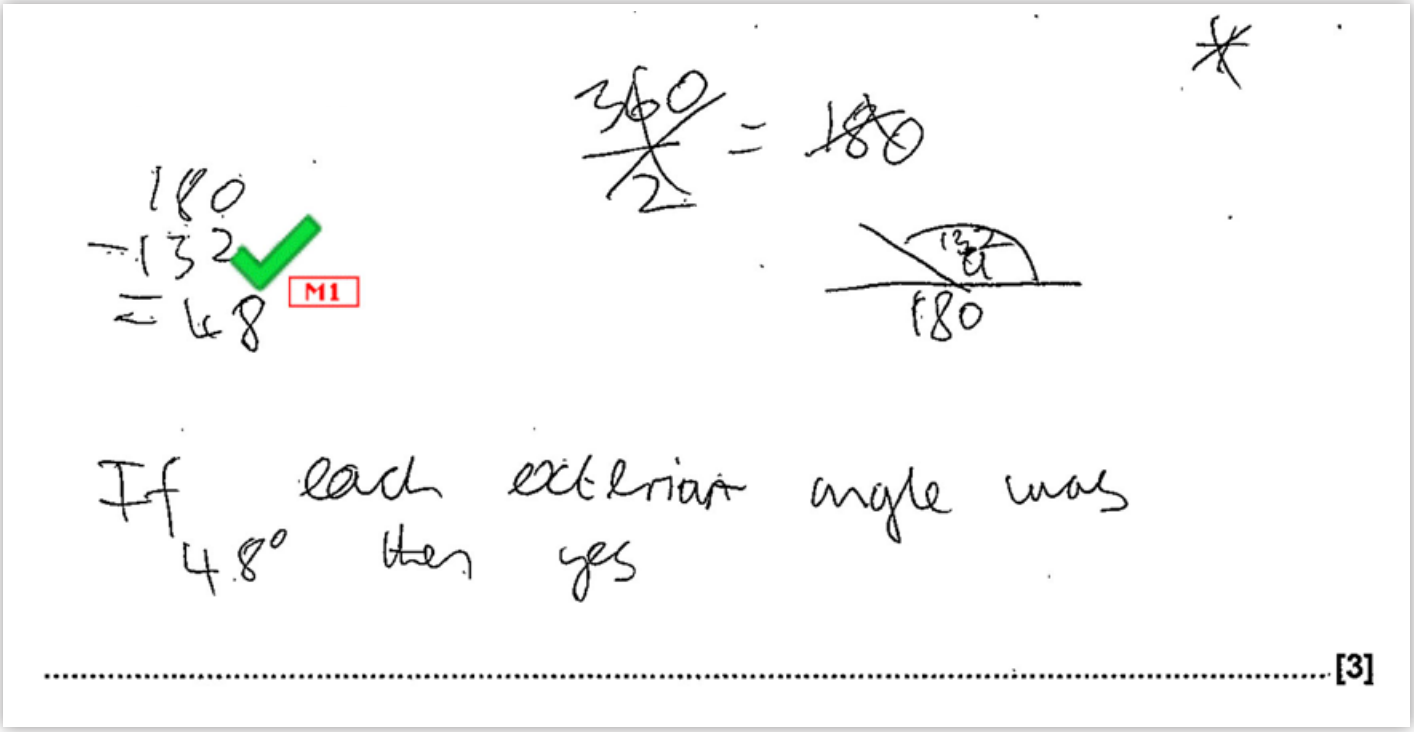
Exemplar 2 – Mark(s): 2



Examiner commentary

The mark scheme allows M1 for each of 129 and 135 shown correctly but then the conclusion is incorrect so 2 marks only scored.

Exemplar 3 – Mark(s): 1



Examiner commentary

M1 is scored for 180 – 132 but then there are no further marks earned as the conclusion is incorrect and the exterior angle of 48 has not been associated with 360 in any way for the second M1.

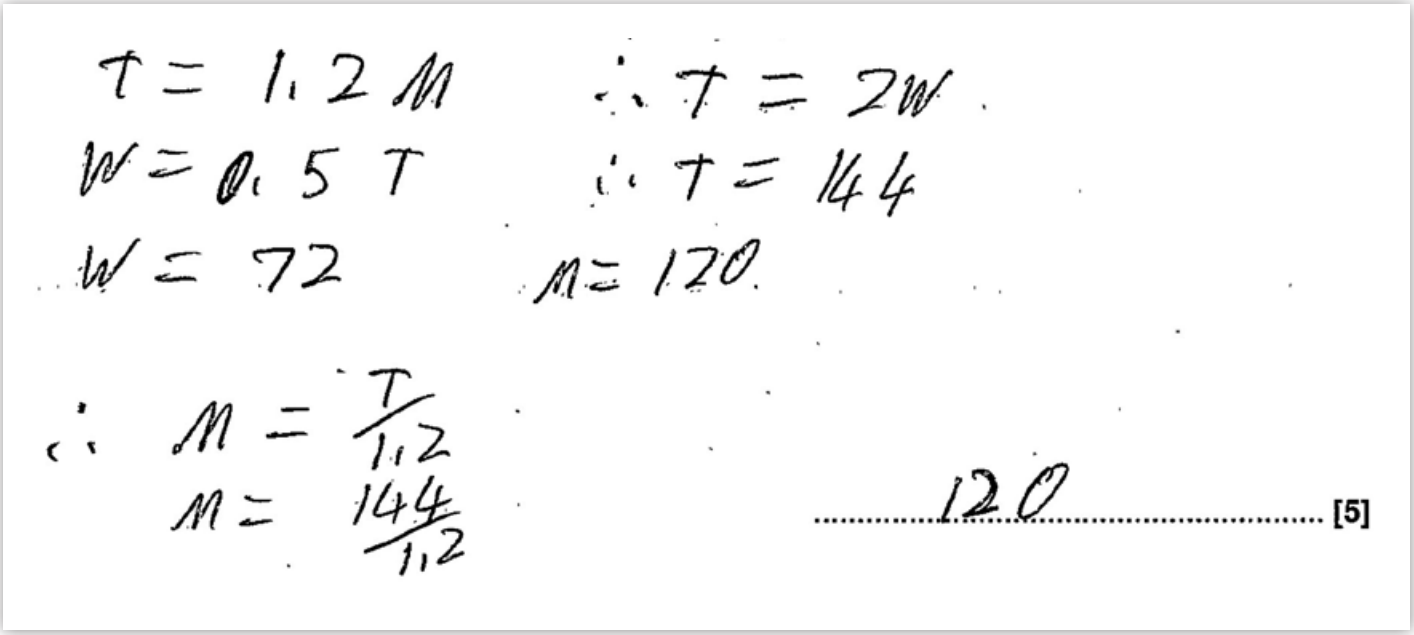
Question 12

Helen delivers parcels.
On Tuesday, Helen delivered 20% more parcels than on Monday.
On Wednesday, Helen delivered 50% fewer parcels than on Tuesday.
On Wednesday, Helen delivered 72 parcels.

Calculate the number of parcels that Helen delivered on Monday.

..... [5]

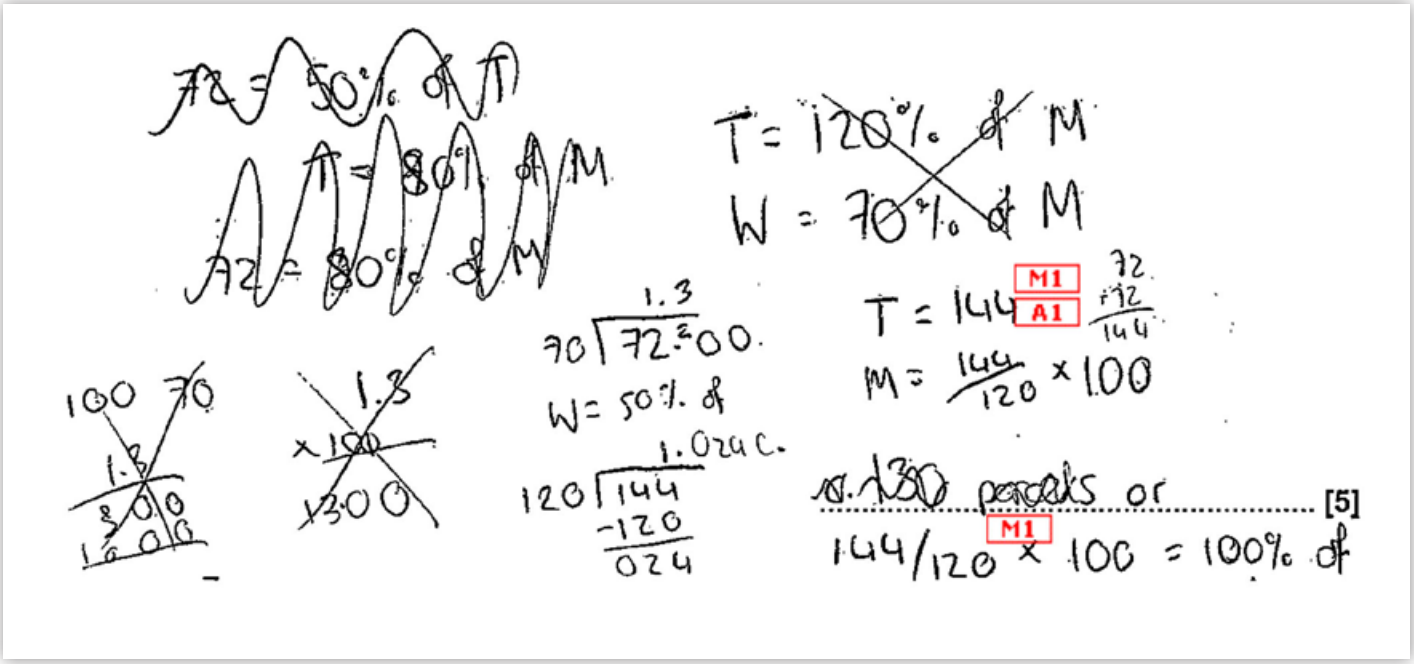
Exemplar 1 – Mark(s): 5



Examiner commentary

A correct answer to this problem using a concise method involving combining the two multipliers and reversing the problem. This approach was only used by a small number of candidates. Most worked in two stages.

Exemplar 2 – Mark(s): 4

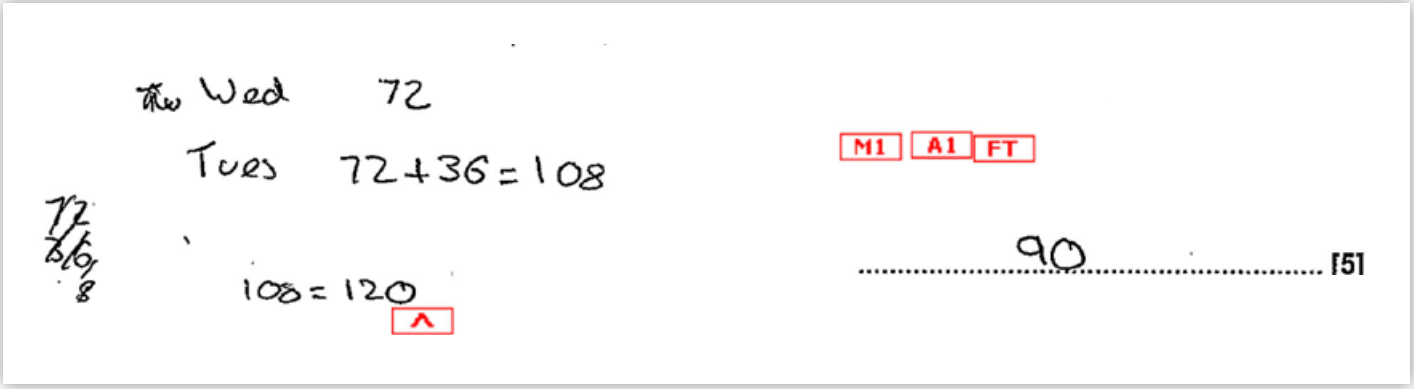


[5]

Examiner commentary

The candidate is working in stages and completes the first stage to Tuesday correctly to obtain 144. They then recognise that 144 is 120% of Monday's total and attempt to divide 144 by 120 and then multiply by 100 which is the correct method but they are unable to complete it correctly. They have shown a correct method which is the equivalent of 72 ÷ (0.5 × 1.2) and are awarded M4.

Exemplar 3 – Mark(s): 2

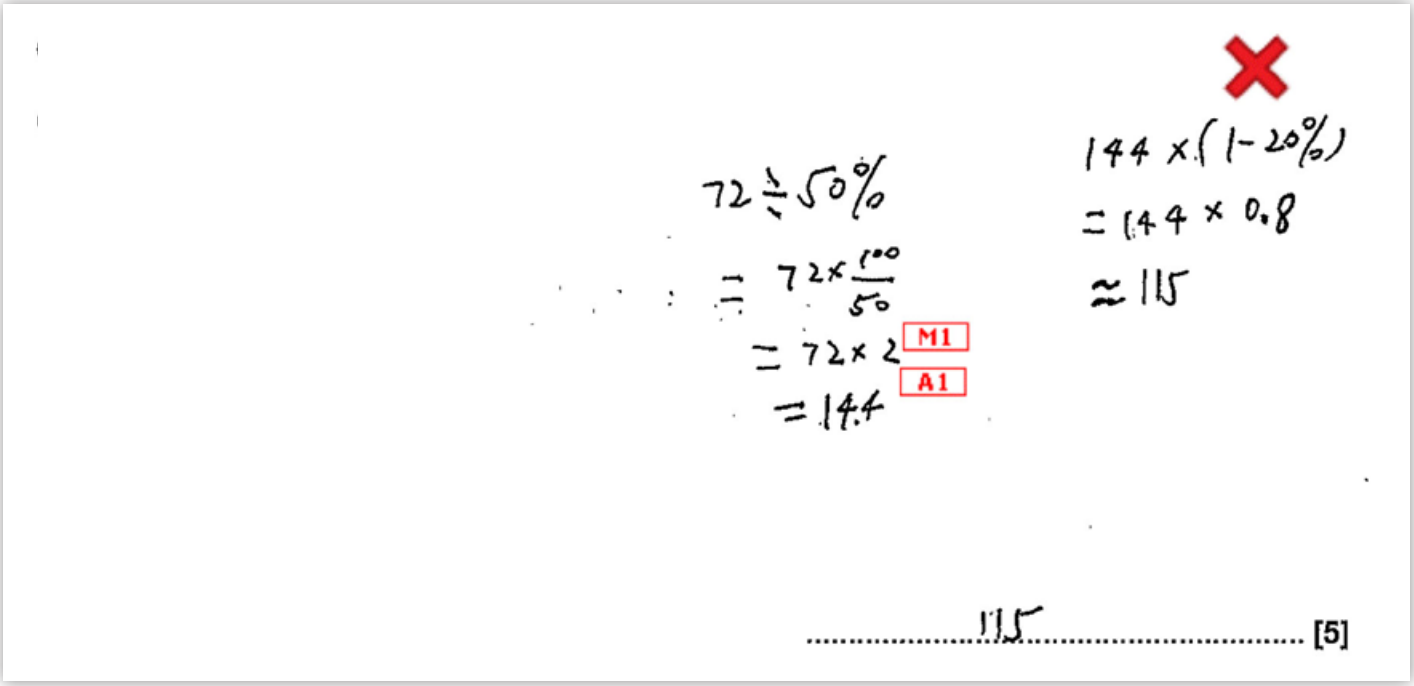


[5]

Examiner commentary

This candidate incorrectly gives Tuesday's total as 108 by increasing 72 by 50% rather than treating 72 as 50% of Tuesday's total. They then associate 120 with 108 and the answer of 90 implies that they have done the second step correctly for their value. The mark scheme allows M1 for their 144 divided by 1.2 and A1FT (follow through) for this correctly evaluated. Although the working is not shown, the answer of 90 is enough to imply the method mark here.

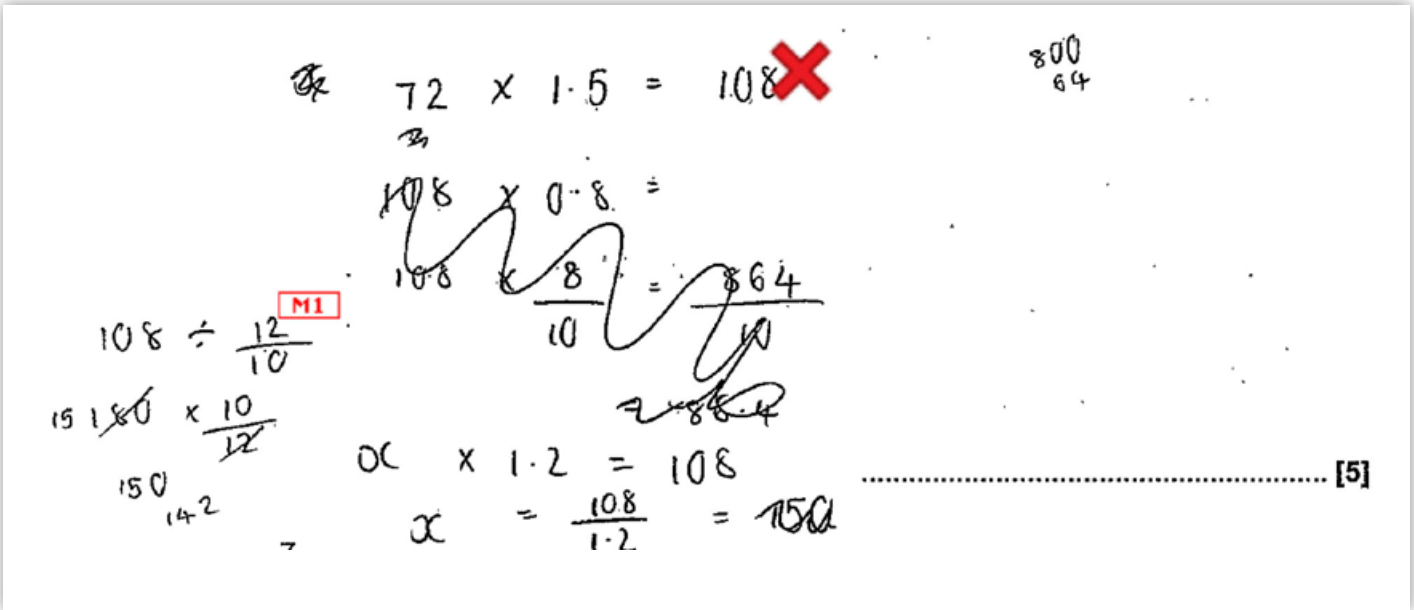
Exemplar 4 – Mark(s): 2



Examiner commentary

This candidate completes the first stage correctly to give Tuesday as 144 and scores M1A1 for this. The second stage is incorrect however and no further marks are scored.

Exemplar 5 – Mark(s): 1



Examiner commentary

This candidate multiplies 72 by 1.5 to give 108 which is incorrect for the first step. They then use their incorrect value 108, and show the intention to divide by 1.2 which is a correct method and scores the second M1. The calculation is not completed correctly and no further marks are scored.

Question 15(b)

There are two errors in Sam's method for finding the value of $64^{\frac{-2}{3}}$ shown below.

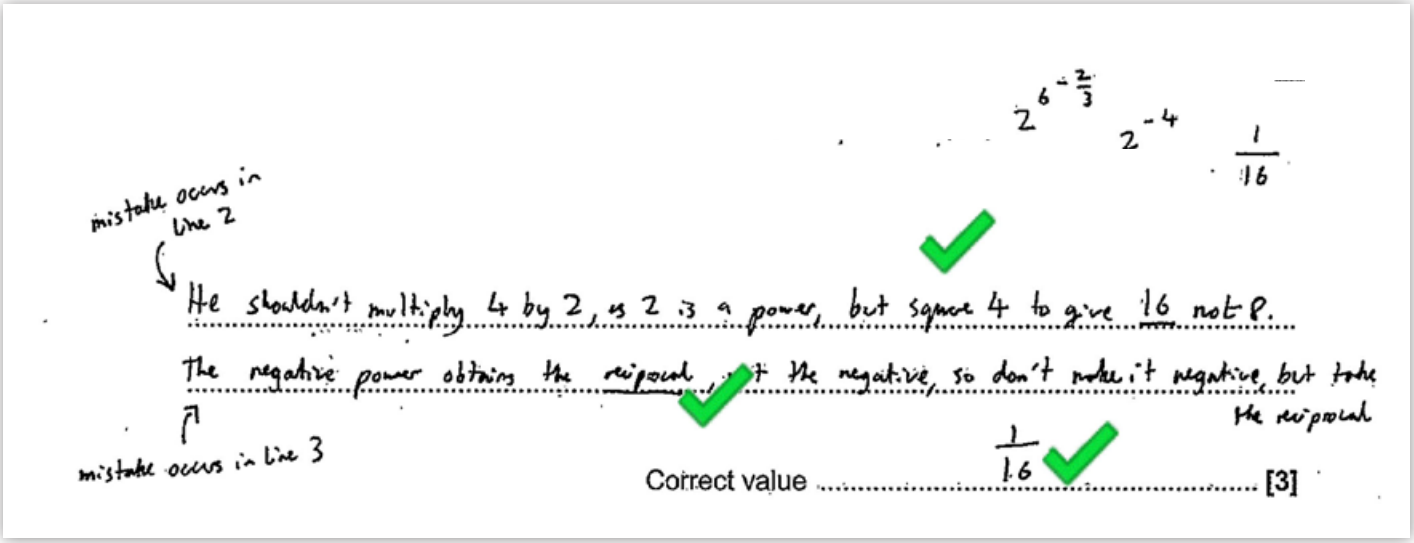
Find the cube root of 64 and then multiply by 2.
The cube root of 64 is 4 and then 4 x 2 = 8.
The negative power makes the answer negative so answer equals -8.

Describe these errors and then give the correct value of $64^{\frac{-2}{3}}$.

.....

Correct value ..... [3]

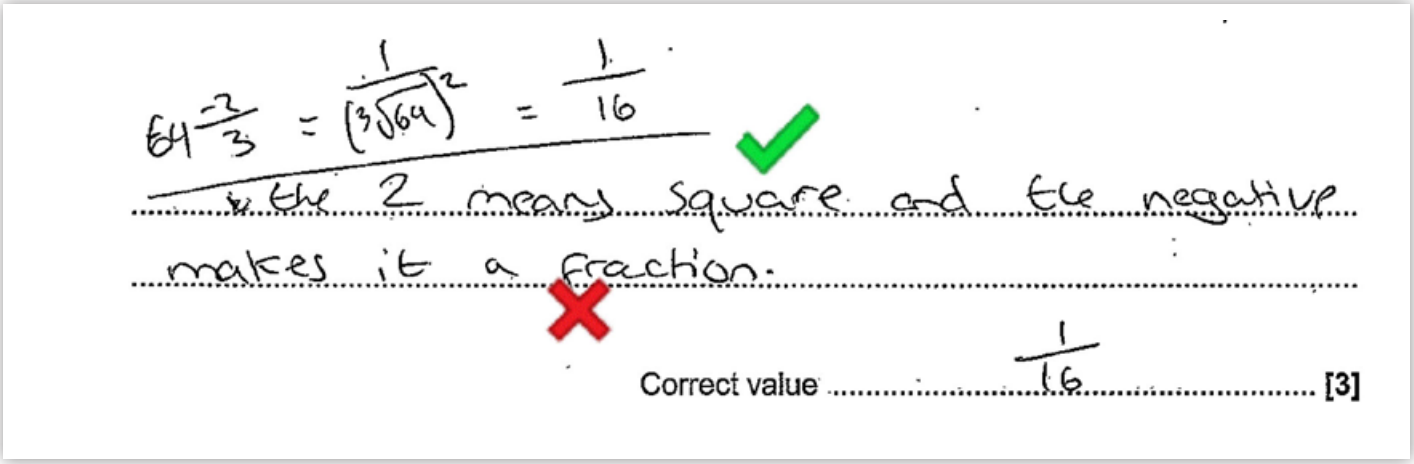
Exemplar 1 – Mark(s): 3



Examiner commentary

In this question, which tests elements of AO3 (evaluating methods used and results obtained), candidates are required to use correct mathematical language in their explanation of the correct steps. This candidate correctly refers to squaring not multiplying by 2 for B1 and also uses the correct term reciprocal when explaining the negative index for a further B1. The answer is also correctly given for a further mark.

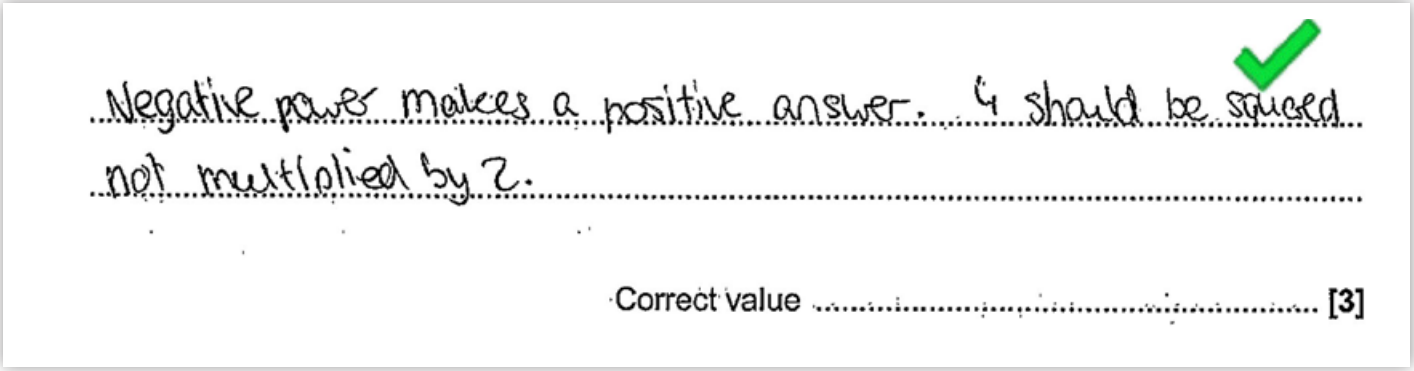
Exemplar 2 – Mark(s): 2



Examiner commentary

This candidate refers to squaring to earn B1, the explanation of the negative index is insufficient however. The explanation that 'the negative makes it a fraction' is not accepted. A further mark is awarded for the correct answer.

Exemplar 3 – Mark(s): 1

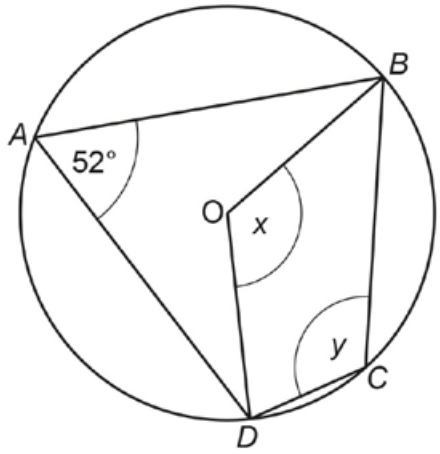


Examiner commentary

Only one mark earned for the reference to 'squared'. The negative index is not explained and no answer is given.

Question 16(a) and (b)

16 A, B, C and D are points on the circumference of a circle, centre O.



Not to scale

Angle BAD = 52°.

(a) Work out angle *x*.
Give a reason for your answer.

x = ... ° reason .....

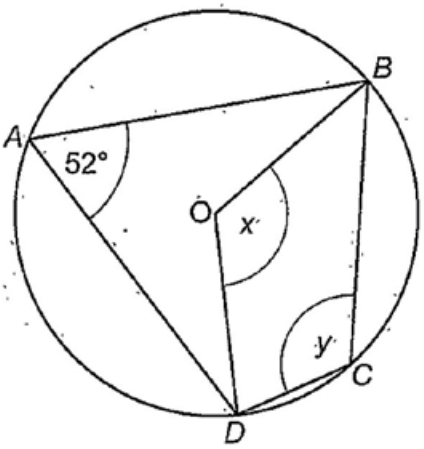
..... **[2]**

(b) Work out angle *y*.
Give a reason for your answer.

y = ... ° reason .....

..... **[2]**

Exemplar 1 – Mark(s): 4



Not to scale

180
52
128

180 − 52

cyclic quadrilateral opposite angles add to 180°.

angle subtended at centre is double angle subtended at circumference.

52 × 2 = 104

Angle BAD = 52°.

(a) Work out angle *x*.
Give a reason for your answer.

x = 104 ° reason angles subtended at the centre of a circle is double the angle subtended at circumference [2]

(b) Work out angle *y*.
Give a reason for your answer.

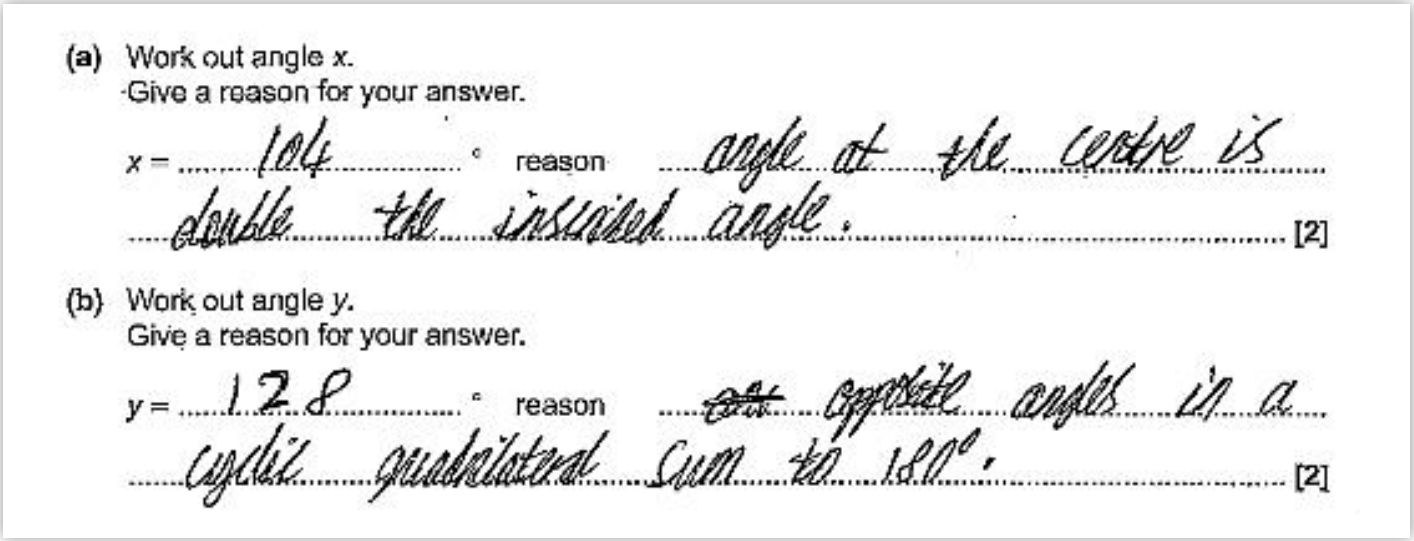
y = 128 ° reason opposite angles in a cyclic quadrilateral add to 180° (180° − 52° = 128°) [2]

Examiner commentary

This question required candidates to justify their answers with the correct geometrical reasons. Correct terminology using the language of circle theorems must be used in these reasons to score the marks.

This candidate gives both angles correctly and uses the correct terminology in both reasons.

Exemplar 2 – Mark(s): 3



(a) Work out angle x.
Give a reason for your answer.

$x =$ 104 ° reason angle at the centre is double the inscribed angle. [2]

(b) Work out angle y.
Give a reason for your answer.

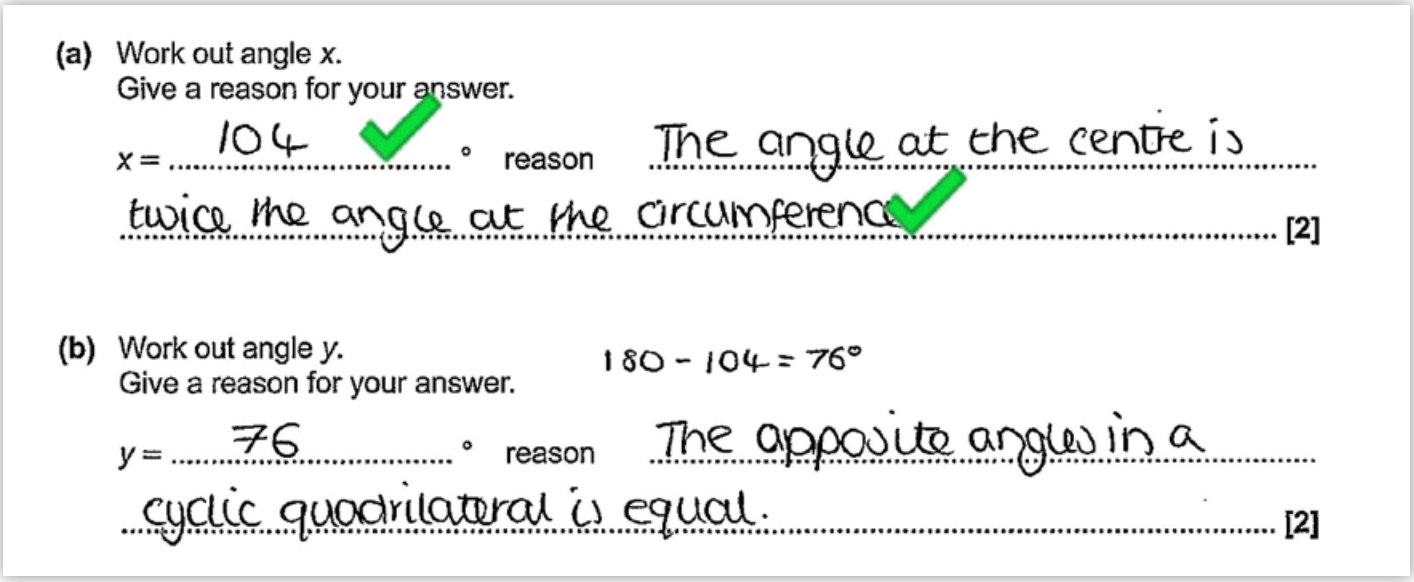
$y =$ 128 ° reason ~~an~~ opposite angles in a cyclic quadrilateral sum to 180°. [2]

Examiner commentary

This candidate scores 2 marks for both x and y correct. The first reason is insufficient - angle at the circumference is required instead of inscribed angle.

The second reason uses the correct terminology and is fine.

Exemplar 3 – Mark(s): 2



(a) Work out angle x.
Give a reason for your answer.

$x =$ 104 ° reason The angle at the centre is twice the angle at the circumference [2]

(b) Work out angle y.
Give a reason for your answer.

180 − 104 = 76°

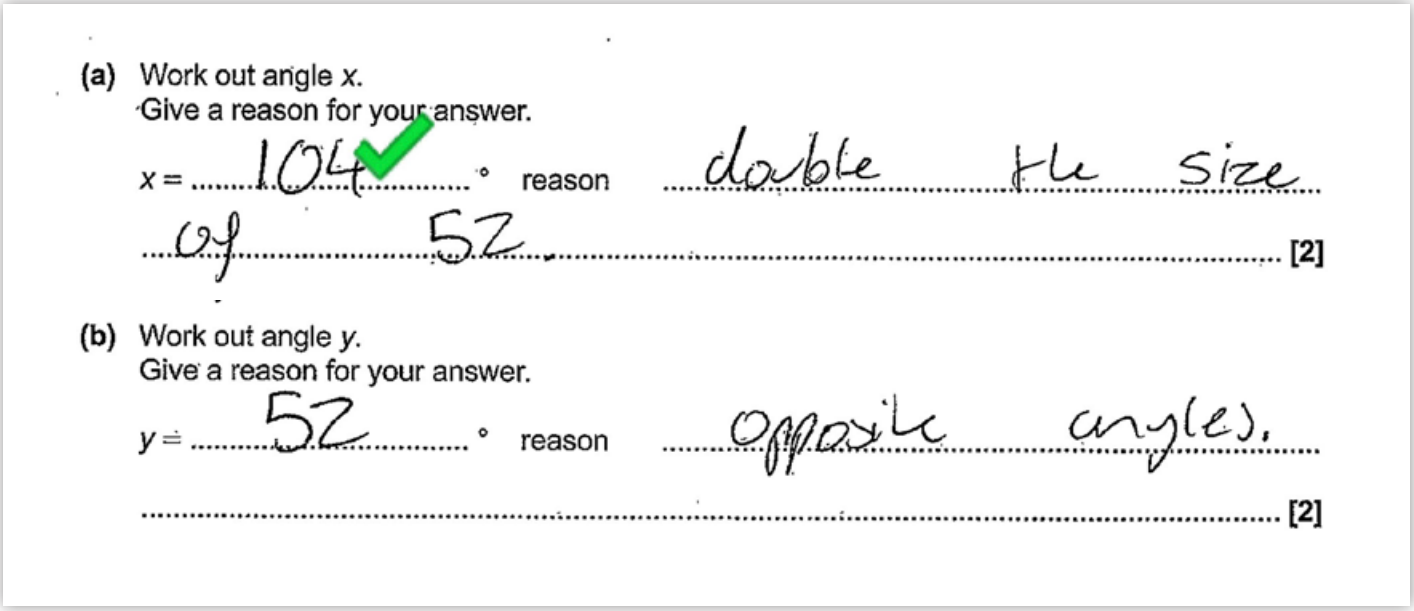
$y =$ 76 ° reason The opposite angles in a cyclic quadrilateral is equal. [2]

Examiner commentary

Angle x is correctly given and a correct reason with the correct terminology is also given for 2 marks.

Angle y is incorrect and the reason given indicates that the candidate recognises cyclic quadrilateral but cannot correctly recall the angle properties.

Exemplar 4 – Mark(s): 1



(a) Work out angle x.
Give a reason for your answer.

$x =$ 104 ° reason double the size of 52. [2]

(b) Work out angle y.
Give a reason for your answer.

$y =$ 52 ° reason opposite angles. [2]

Examiner commentary

Angle x is correctly given for one mark. However, angle y is incorrect and scores no marks. This candidate recognises the theorem for angle x but is unable to use correct terminology in describing it. This was a common error made by candidates.

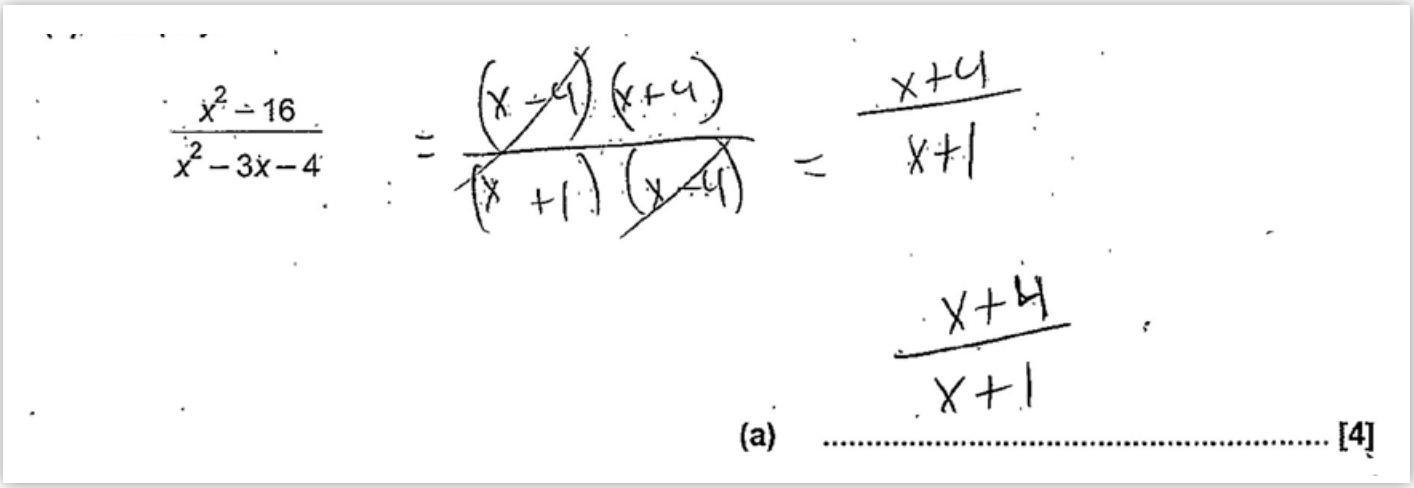
Question 17(a)

Simplify.

$$\frac{x^2 - 16}{x^2 - 3x - 4}$$

(a) ..... [4]

Exemplar 1 – Mark(s): 4

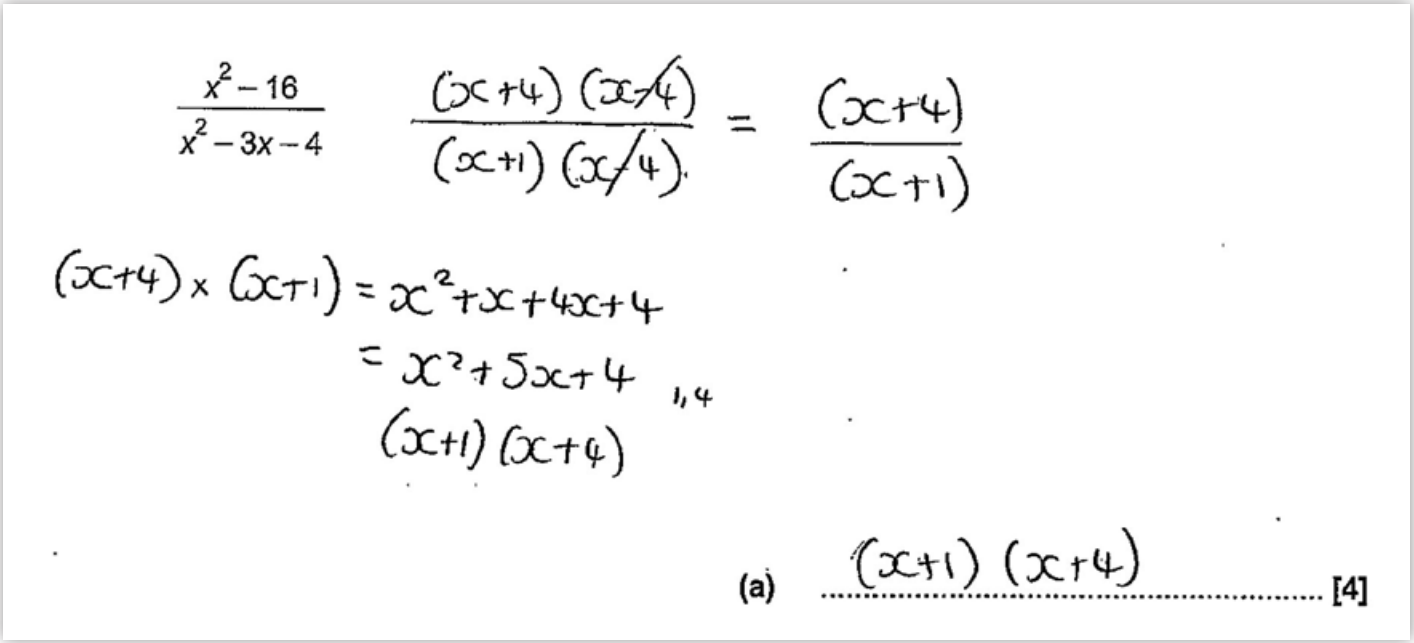


Examiner commentary

Mark scheme has nfww (not from wrong working) so working must be checked to see if the answer is correctly obtained.

Correct factorisation of numerator and denominator and correct cancelling of common factors leading to correct answer, 4 marks scored.

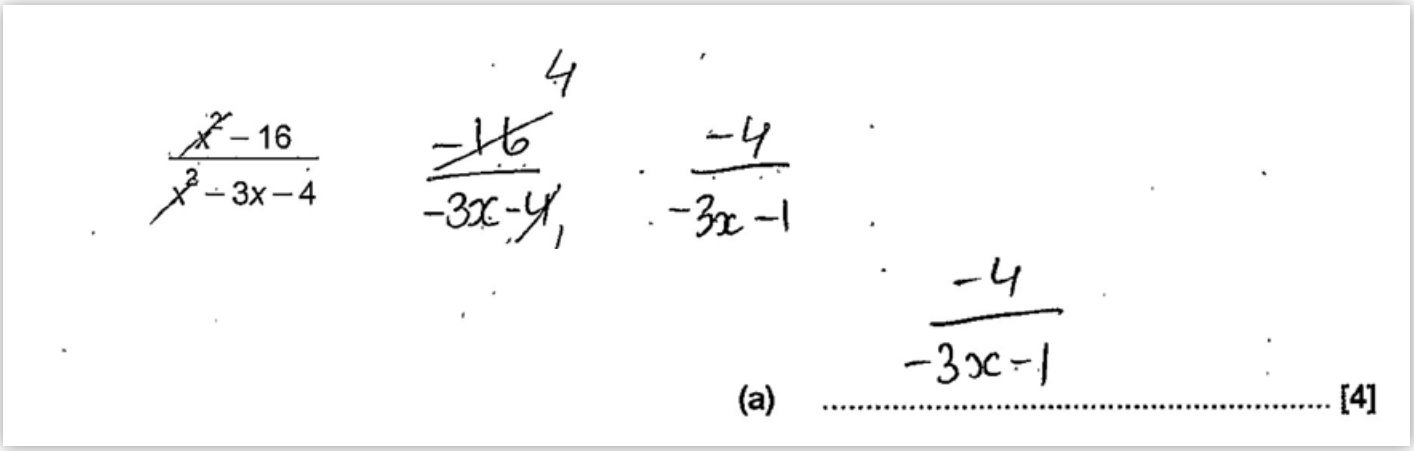
Exemplar 2 – Mark(s): 3



Examiner commentary

Correct factors and correct answer obtained in working but then further steps prevent full marks. Mark scheme has 'final answer' so this gets 3 marks only – M1 for correct factors for numerator and M2 for correct factors for denominator.

Exemplar 3 – Mark(s): 0



Examiner commentary

This was a common incorrect method used by less able candidates. No attempt at factors and incorrect cancelling so 0 marks scored.

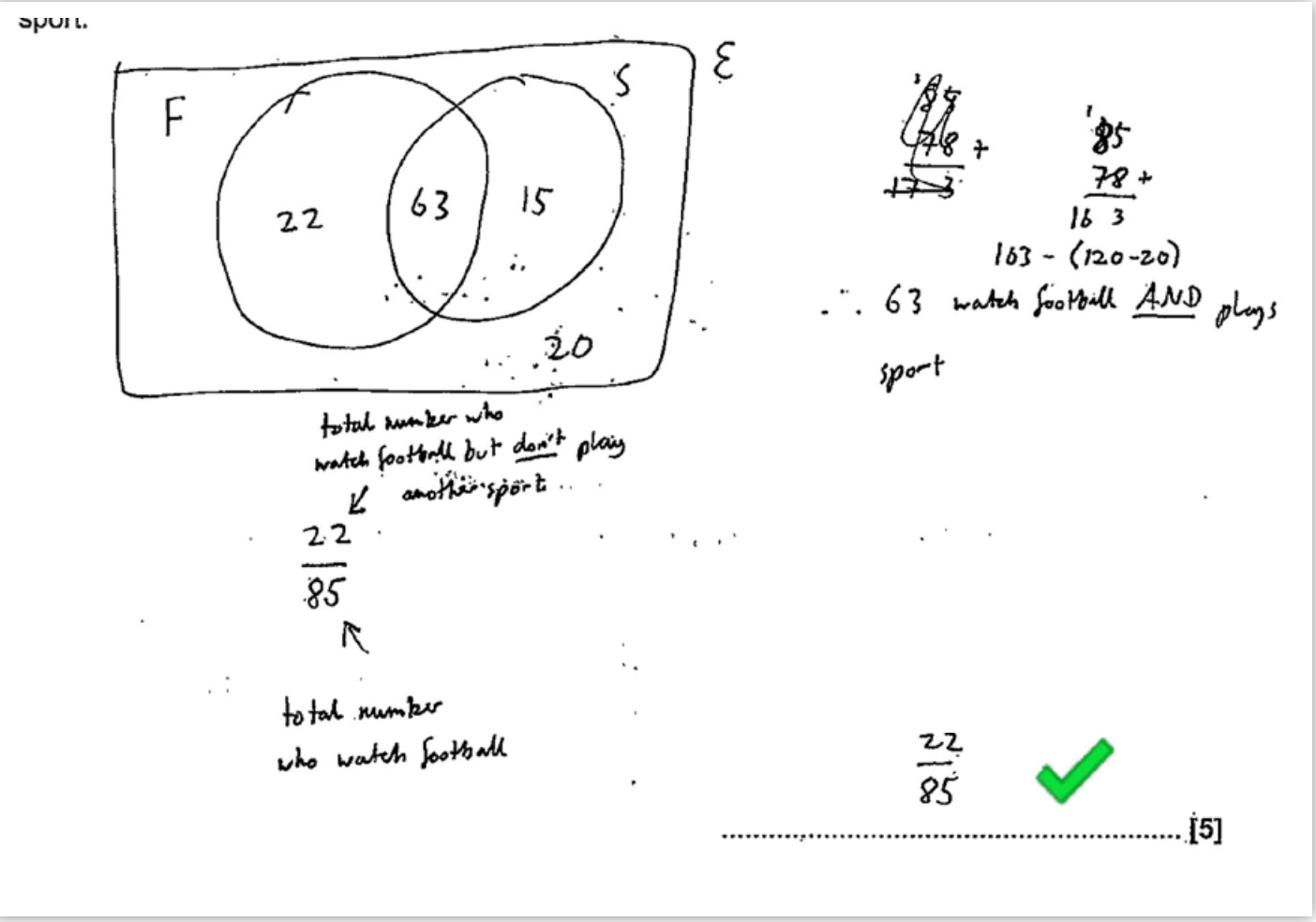
Question 18

In a group of 120 adults, 85 watch football, 78 play a sport and 20 do neither.

Find the probability that an adult chosen at random from those who watch football does not play a sport.

..... [5]

Exemplar 1 – Mark(s): 5



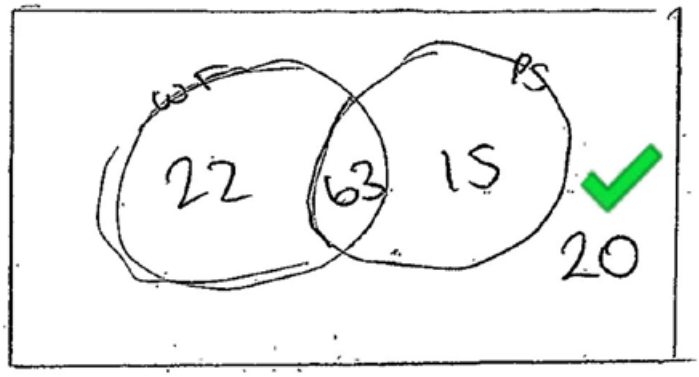
Examiner commentary

Correct answer is given so this scores 5 marks.

Exemplar 2 – Mark(s): 4

18 In a group of 120 adults, 85 watch football, 78 play a sport and 20 do neither.

Find the probability that an adult chosen at random from those who watch football does not play a sport.



85 + 78 = 163

163 + 20 = 183

85 − 63 = 22

78 − 63 = 15

183 − 120 = 63

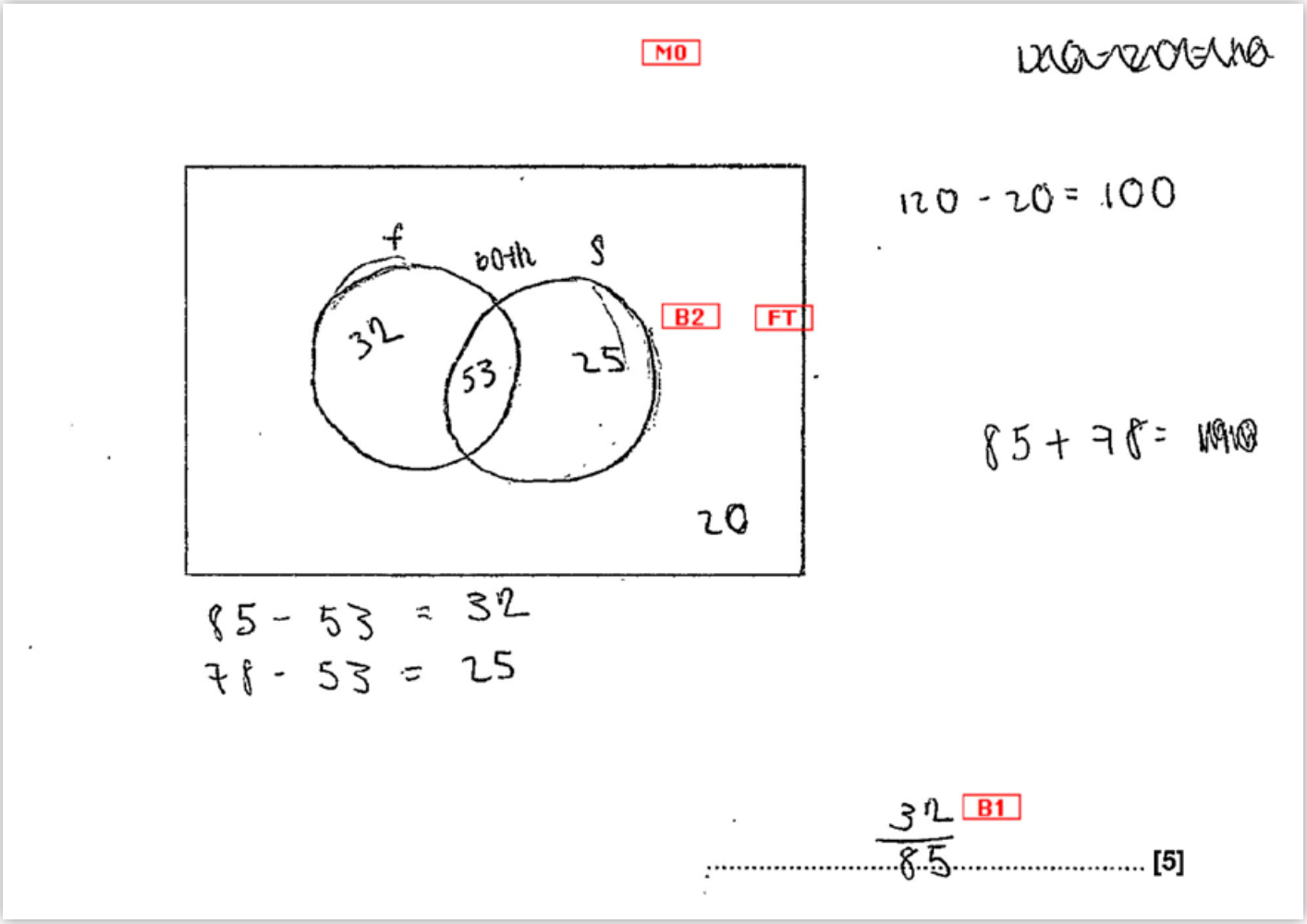
$\frac{22}{120} = \frac{11}{60}$

$\frac{11}{60}$ [5]

Examiner commentary

The value 63 is shown which earns the first M1. The candidate draws a correct Venn diagram, including the universal set, to score B2. The answer of $\frac{22}{120}$ is incorrect however as the candidate has overlooked the condition that the person is chosen from those who like football and not from the set of adults. It does score a further B1 however for $\frac{22}{n}$ seen.

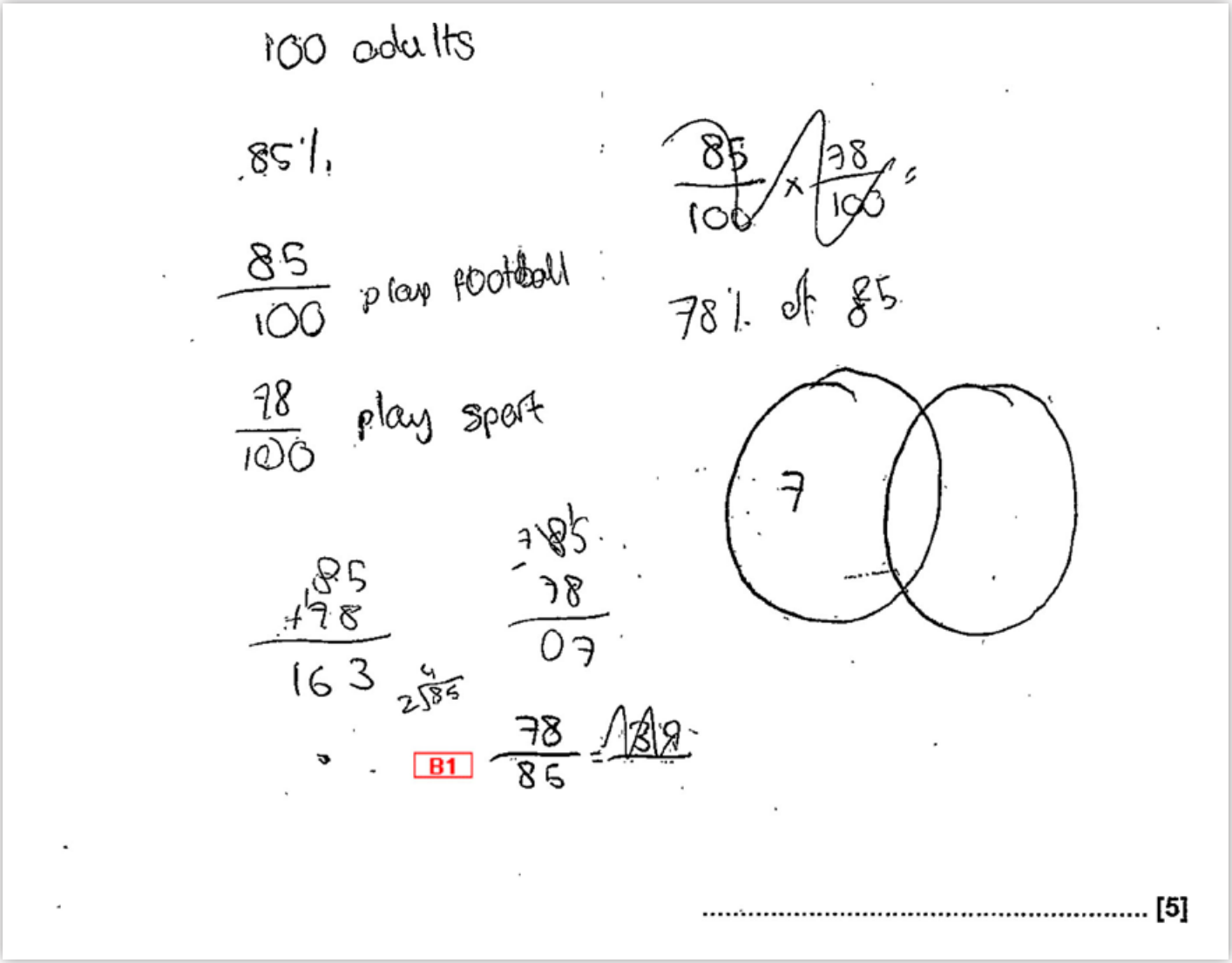
Exemplar 3 – Mark(s): 3



Examiner commentary

53 is incorrect and we do not see where this has come from so the candidate earns M0. The Venn diagram correctly follows through from this incorrect value and earns B2FT. The final answer uses the values from the Venn diagram and scores a further B1 for $\frac{n}{85}$.

Exemplar 4 – Mark(s): 1

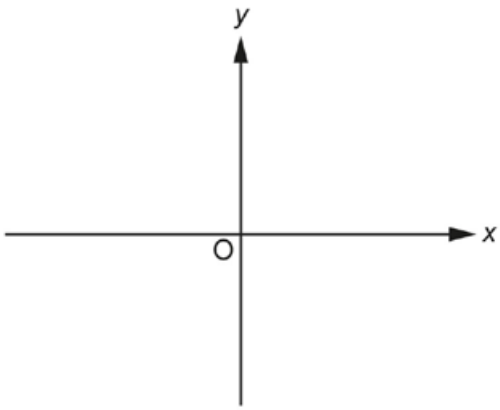


Examiner commentary

Neither 63 or 22 are given in working and there is no method seen that would lead to these two values so M0. A Venn diagram has been started but is incomplete and has no relevant values so B0. The final answer is in the form $\frac{n}{85}$ which earns B1.

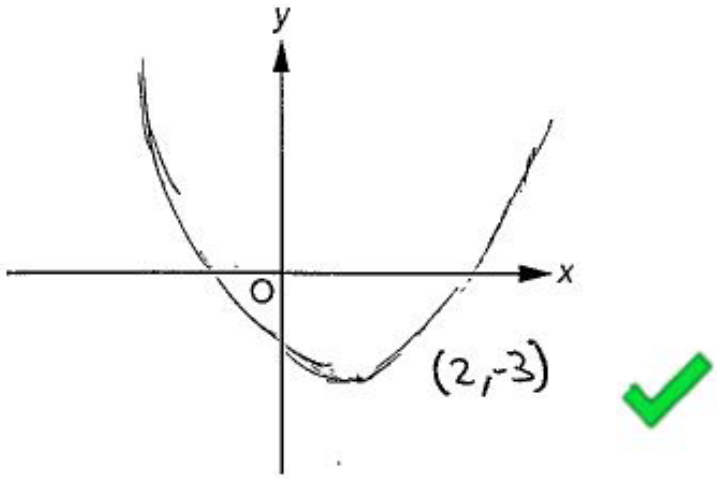
Question 19(a)

Sketch the graph of $y = (x-2)^2 - 3$.
Show the coordinates of any turning points.



[3]

Exemplar 1 – Mark(s): 3

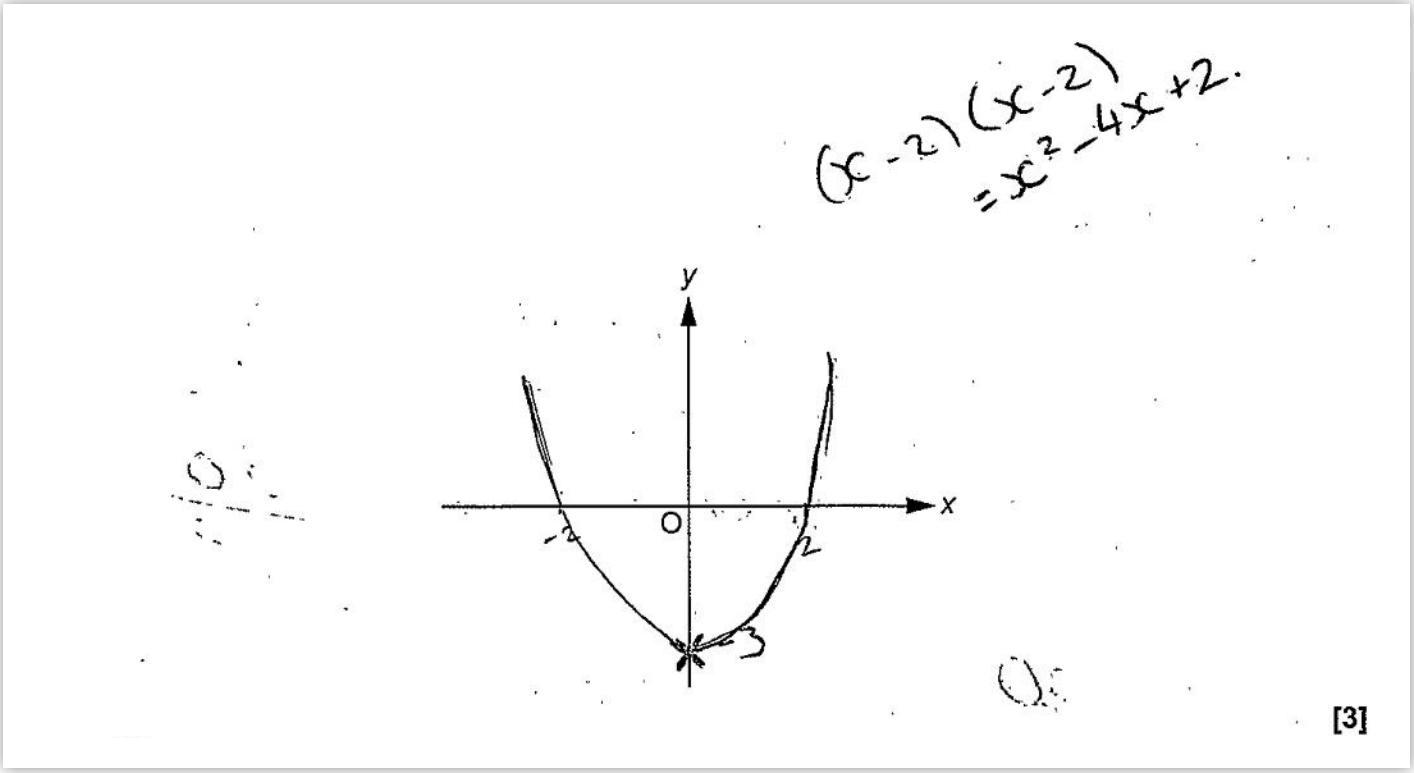


[3]

Examiner commentary

Correct sketch with minimum value clearly indicated, scores full marks.

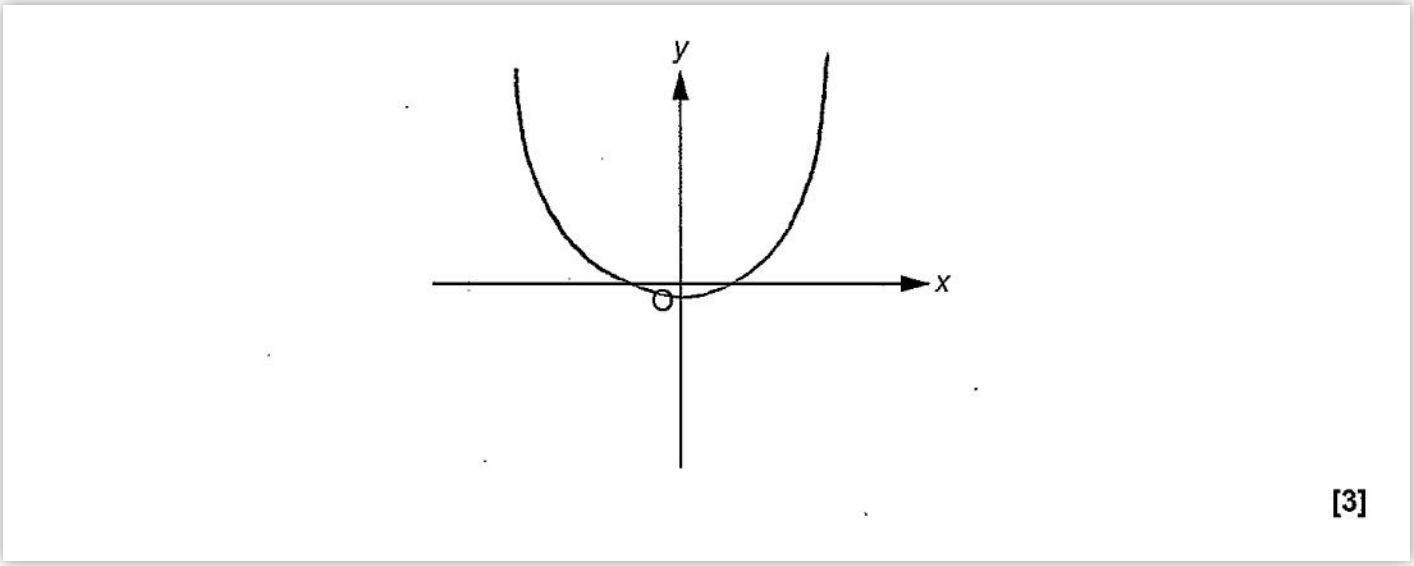
Exemplar 2 – Mark(s): 2



Examiner commentary

Correct U-shaped graph but minimum value (0, ⁻3) is incorrect.
This earns B1 for shape and B1 for minimum at (*k*, ⁻3).

Exemplar 3 – Mark(s): 1

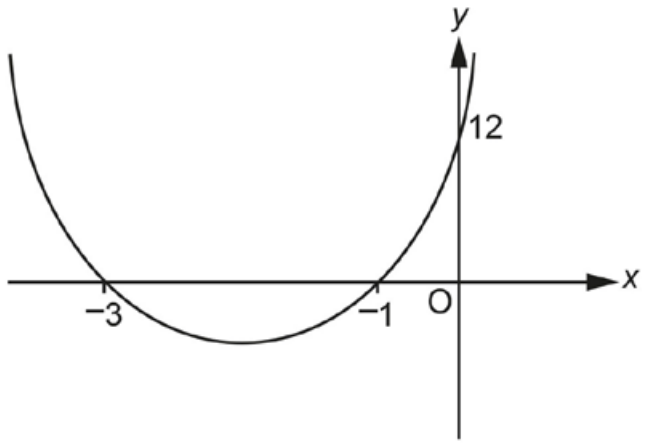


Examiner commentary

Correct U shape but no attempt to show the minimum value so B1 only.

Question 19(b)

The sketch shows part of a graph which has equation $y = ax^2 + bx + c$.



Not to scale

Find the values of a, b and c.

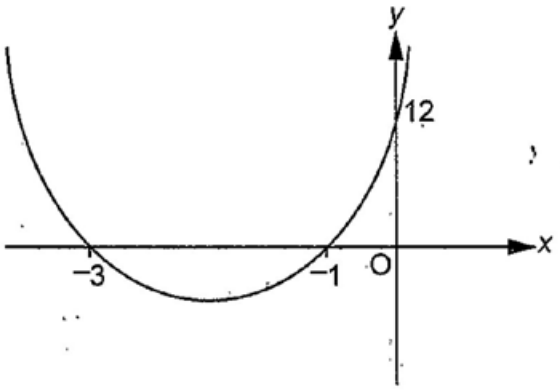
(b) $a =$ .....

$b =$ .....

$c =$ ..... **[5]**

Exemplar 1 – Mark(s): 5

(b) The sketch shows part of a graph which has equation $y = ax^2 + bx + c$.



Not to scale

$4x^2 + 16x + 12 = 0$

$4(x^2 + 4x + 3) = 0$

$4(x+3)(x+1) = 0$

Find the values of a, b and c.

when $y = 0$, ~~$x = +3$ or $+1$~~ $x = -3$ or -1

factorised form: $(x+3)(x+1) = y$

$y = x^2 + 4x + 3$ × 4

BUT when $x = 0$, $y = 12$

$\therefore y = 4x^2 + 16x + 12$

(b) $a =$ 4

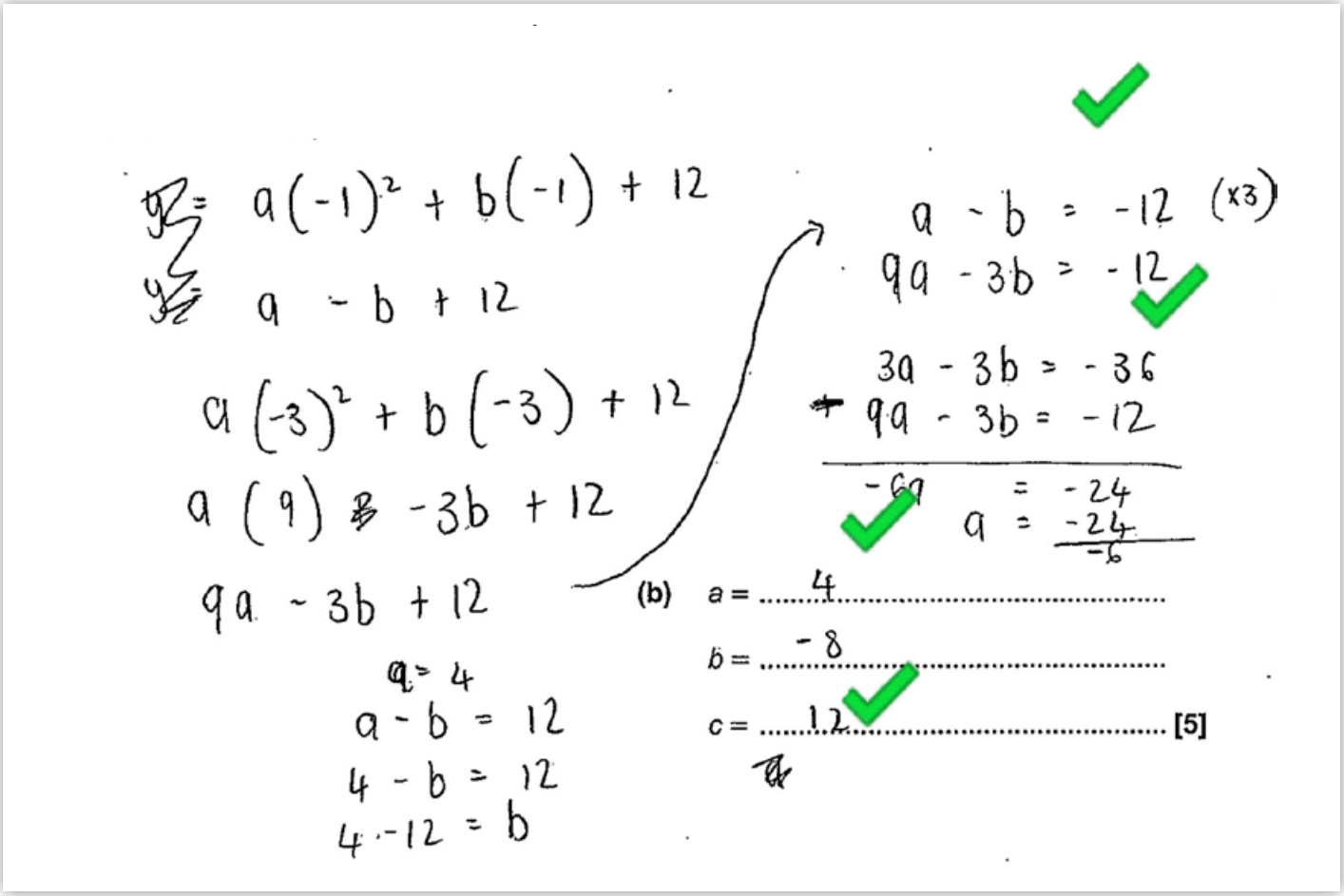
$b =$ ~~16~~ 16

$c =$ 12 [5]

Examiner commentary

The candidate uses the roots from the graph to obtain the factors $(x + 3)(x + 1)$ and correctly expands. They realise that a 'scaling factor' is needed to give y-intercept at (0, 12) and obtain all 3 correct values. Full marks scored.

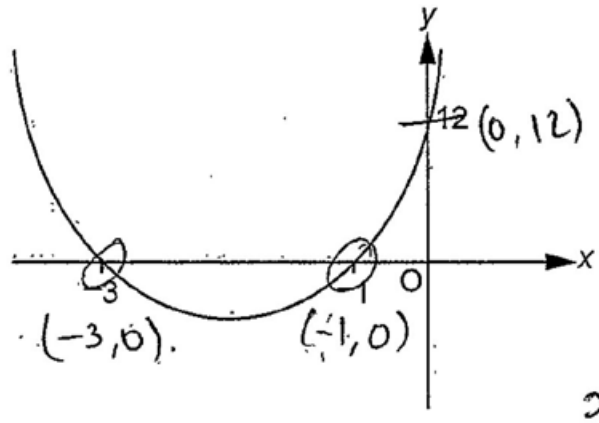
Exemplar 2 – Mark(s): 3



Examiner commentary

This candidate uses a different approach with simultaneous equations using the two coordinates (−3, 0) and (−1, 0). The *a* value is correctly calculated but then an error in the substitution stage leads to an error in the *b* value. This candidate scores B3 for *c* = 12 and *a* = 4.

Exemplar 3 – Mark(s): 2



Not to scale

Find the values of a, b and c.

(c) y intercept = 12

$x = -1$, $x = -3$

$(x + 1)(x + 3)$

$x^2 + 3x + x + 3$

$x^2 + 4x + 3$

(b) $a =$ 1

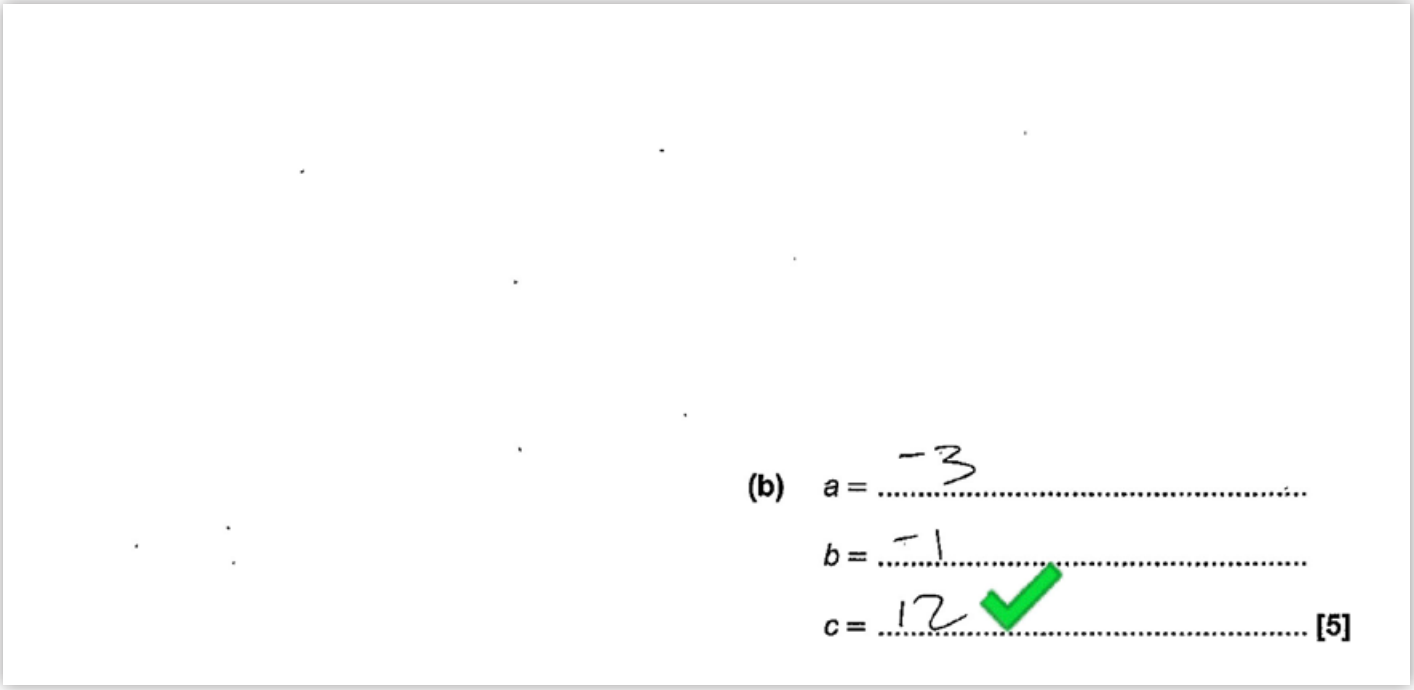
$b =$ 4

$c =$ ~~12~~ 3 [5]

Examiner commentary

An attempt is made to use factors from the roots and the factors are correctly expanded. The candidate does not consider the *y*-intercept and does not relate the expanded expression to the value (0, 12). They score M1 for the factors and A1 for the expansion.

Exemplar 4 – Mark(s): 1

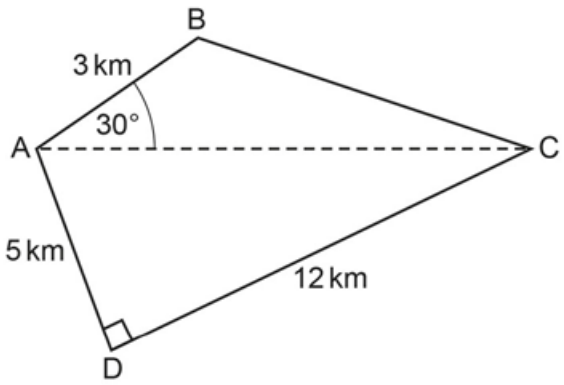


Examiner commentary

There is no working shown by this candidate. Looking at the answers, both the *a* and *b* values are incorrect but the *c* value is correct so B1 is scored.

Question 20

The diagram shows some land in the shape of a quadrilateral, ABCD.



Not to scale

AB = 3 km, AD = 5 km, CD = 12 km and angle BAC = 30°.

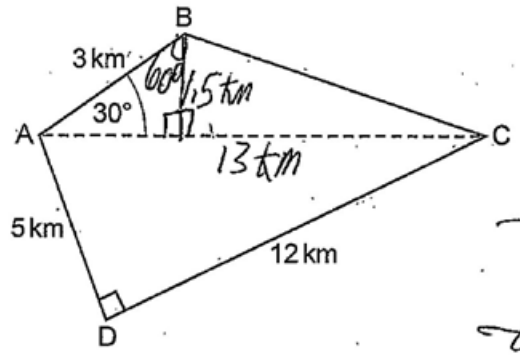
The land is sold for £10 million per square kilometre.

Calculate the total cost of the land.

£ ..... million **[7]**

Exemplar 1 – Mark(s): 7

The diagram shows some land in the shape of a quadrilateral, ABCD.



Not to scale

AB = 3 km, AD = 5 km, CD = 12 km and angle BAC = 30°

The land is sold for £10 million per square kilometre.

Calculate the total cost of the land.

$\cos A = \frac{b^2+c^2-a^2}{2bc}$

$\cos A = \frac{13^2+12^2-5^2}{(2\times13\times12)}$

$\cos A = \frac{(169+144)-25}{312}$

$\cos A = \frac{288}{312}$

$\cos A = \frac{144}{156}$

$\tan\theta =$

$\sin 30 = \frac{O}{H}$

$\frac{O}{3} = \frac{1}{2}$

$O = 1.5$

$\frac{1}{2}ab\sin C$

$= \frac{1}{2}(13\times3)\times0.5$ ✓

$= \frac{1}{2}(39)\times0.5$

$= 19.5\times0.5$

$= 9.75\ km^2$

(Area of ABC = $9.75\ km^2$)

$a^2+b^2=c^2$

$25+144=c^2$

$c^2=169$

$c=13$ ✓

$\frac{1}{2}bh$ #

$=\frac{1}{2}(5\times12)$

$=0.5\times60$

$=30\ km^2$

$10{,}000{,}000$

$39.75\times$

$= 397{,}500{,}000$

£ 397.5 million [7]

$30 + 9.75$

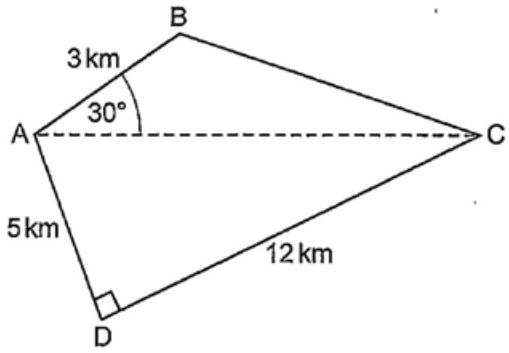
$= 39.75\ km^2$

Examiner commentary

The final answer is correct and comes with supporting working and scores 7 marks.

Exemplar 2 – Mark(s): 4

The diagram shows some land in the shape of a quadrilateral, ABCD.

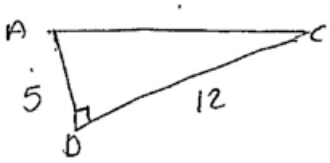


Not to scale

AB = 3 km, AD = 5 km, CD = 12 km and angle BAC = 30°.

The land is sold for £10 million per square kilometre.

Calculate the total cost of the land.



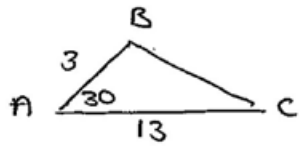
$c^2 = a^2 + b^2$
$c^2 = 5^2 + 12^2$
$c^2 = 25 + 144$
$c^2 = 169$
$c = \sqrt{169}$
$c = 13$ B2

AC = 13km.

Area = $\frac{b \times h}{2} = \frac{5 \times 13}{2}$

$= \frac{65}{2} = 32.5 km^2$

$32.5 \times 10 = 325$ million.



$\frac{1}{2} ab \sin C$. M1

$\frac{1}{2} \times 3 \times 13 \times \sin 30$.

$\frac{1}{2} \times 39 \times \sin 30$

$\frac{39}{2} = 19.5$ $19.5 \times \sin 30$.

$\sin 30 = \frac{\sqrt{1}}{2}$ B1

£ ..... million [7]

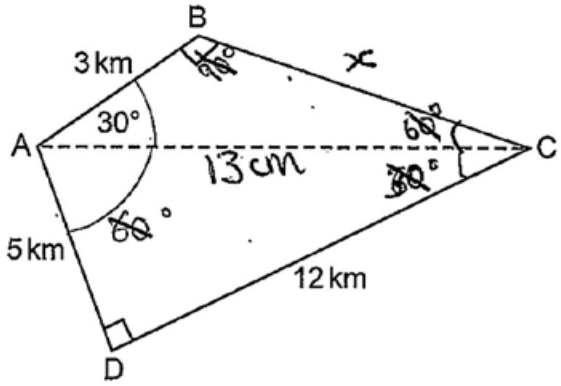
Examiner commentary

This candidate correctly gives the length of AC as 13km which earns B2.

The method for the area of triangle ABC is correctly shown also but the area for triangle ACD is incorrect as they have used 5 and 13 rather than 5 and 12 in the calculation, so this earns M1 only. $\sin 30 = \frac{\sqrt{1}}{2}$ is given credit for $\sin 30 = 0.5$ soi and scores the B1indep mark making 4 marks altogether.

Exemplar 3 – Mark(s): 2

The diagram shows some land in the shape of a quadrilateral, ABCD.



Not to scale

AB = 3 km, AD = 5 km, CD = 12 km and angle BAC = 30°.

The land is sold for £10 million per square kilometre.

Calculate the total cost of the land.

area of triangle = $a^2 + b^2 = c^2$

B2

$5^2 + 12^2 = 169^2$ $\sqrt{169} = 13$ cm

25 144

AC = 13 cm

$3^2 + 13^2 = 178$ $\sqrt{178} = ?$

9 169

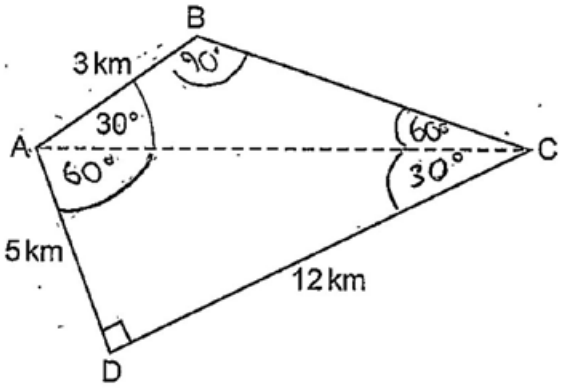
£ ..... million [7]

Examiner commentary

The candidate correctly calculates the length of AC as 13km and earns B2 for this but there is no further working of any merit.

Exemplar 4 – Mark(s): 1

The diagram shows some land in the shape of a quadrilateral, ABCD.



Not to scale

AB = 3 km, AD = 5 km, CD = 12 km and angle BAC = 30°.

The land is sold for £10 million per square kilometre.

Calculate the total cost of the land.

90 + 30 = 120

180 − 120 = 60

$\frac{1}{2} b \times h = 6 \times 5 = 30 km^2$ M1

180 − 90 − 60 = 30

$\Delta ADC = 30 km^2$

$\Delta ADC = £300$ million

£ ..... million [7]

Examiner commentary

No attempt is made to work out length AC which is needed to find the total area of the land.

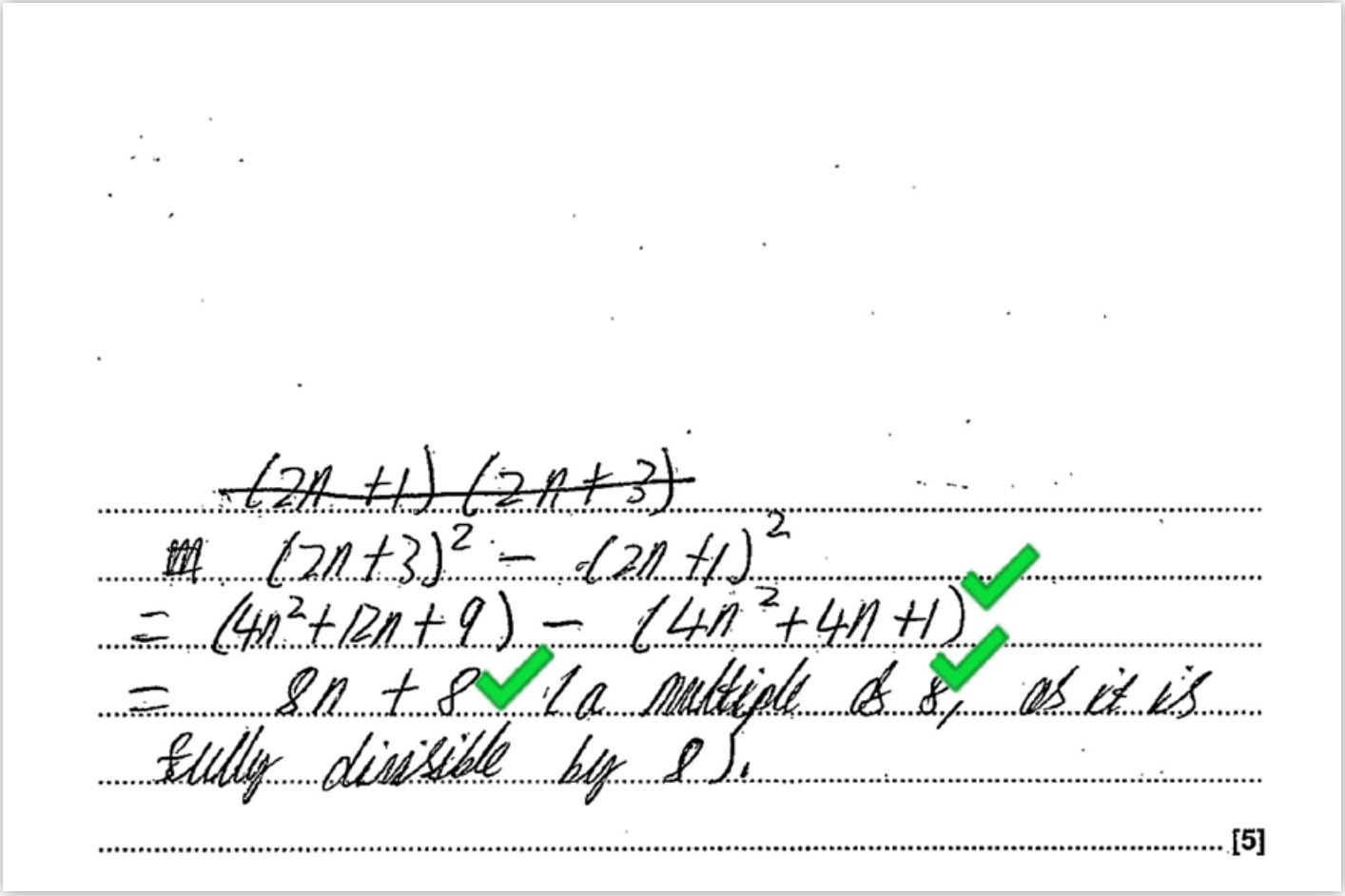
There is a correct calculation for the area of triangle ACD leading to 30 which earns M1. No further constructive working is shown.

Question 21(b)

Prove that the difference between the squares of two **consecutive** odd numbers is a multiple of 8.

..... [5]

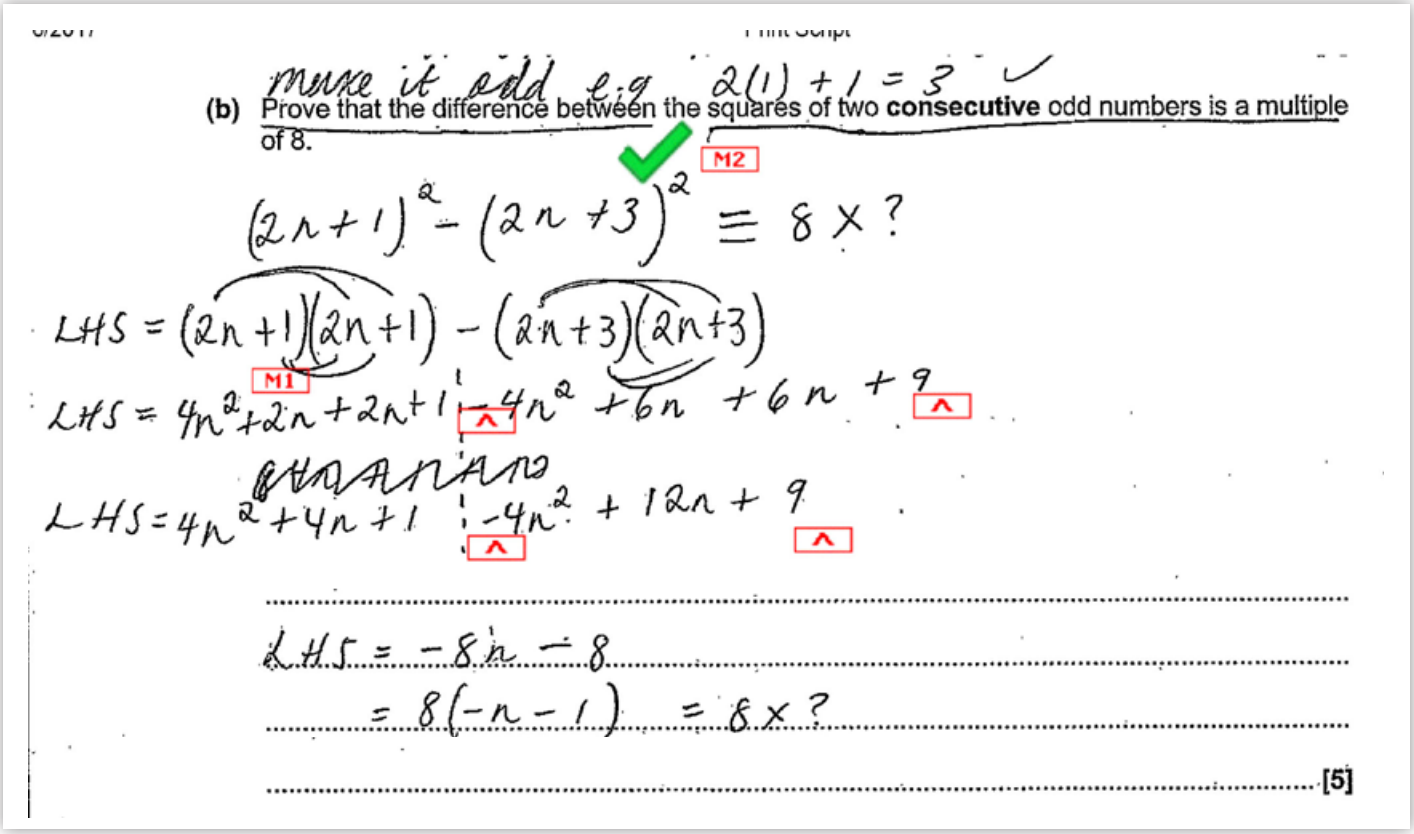
Exemplar 1 – Mark(s): 5



Examiner commentary

A perfect answer using the subtraction of algebraic expressions for two odd numbers and correctly expanding both brackets and completing to $8n + 8$ with a correct conclusion.

Exemplar 2 – Mark(s): 3

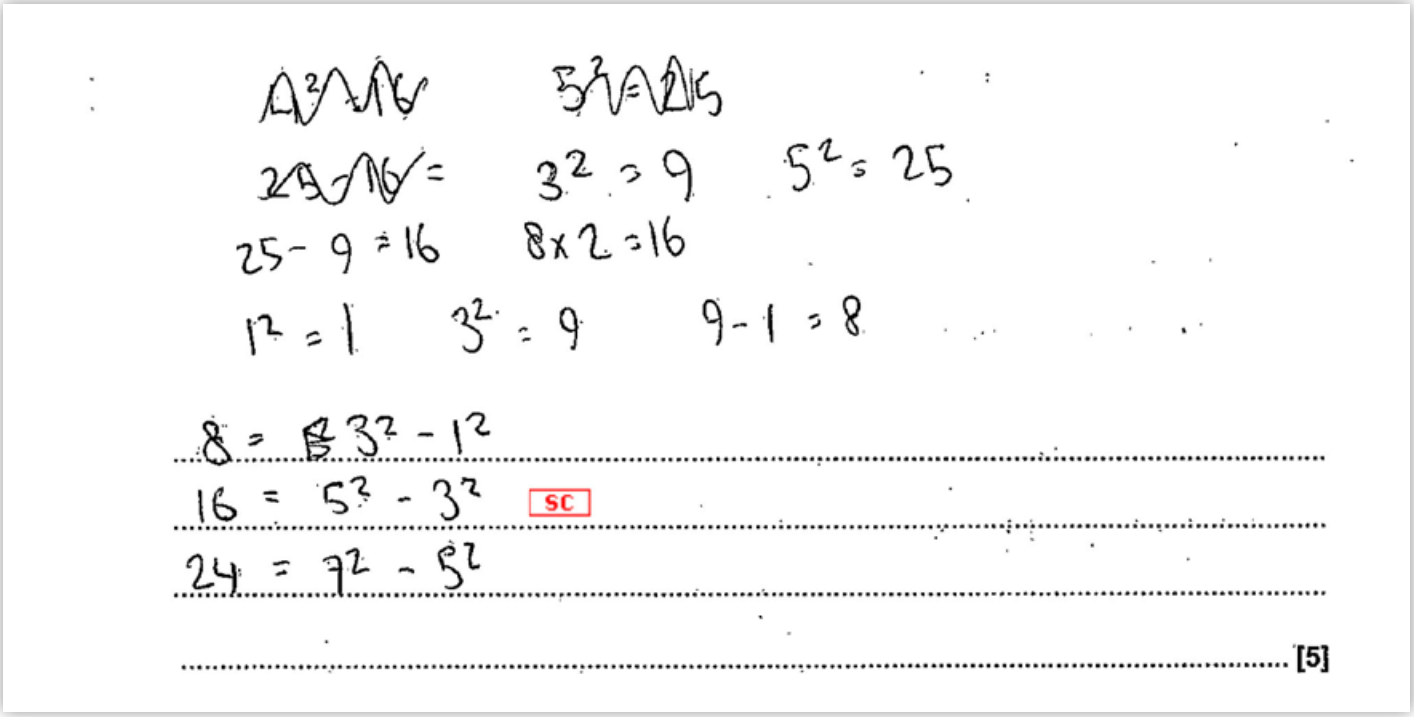


Examiner commentary

This candidate reverses the expressions which is acceptable and earns M2 for the initial algebraic statement. Although both brackets are expanded correctly, there is an error with the signs when subtracting the second expanded expression. The candidate should have either bracketed the whole of the second expression or taken care of the signs with each individual term. This error means only M1 is earned for the second stage and the final A mark is also not given as an error has been seen.

On 'show that' and proof questions each stage of the working must be shown and there must not be any error(s) seen to earn full marks.

Exemplar 3 – Mark(s): 1



Examiner commentary

A number of candidates attempted to justify the statement using numeric examples.

This candidate does not use an algebraic approach and so the method marks are not available. The mark scheme allows, after 0 scored, SC1 for 2 correctly evaluated numeric examples which this candidate has shown.

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