# Functional Skills Certificate

# **Functional Mathematics**

Level 2
Mark scheme

4368
June 2016

Version: 1.0 Final

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

**Glossary for Mark Schemes**

Examinations are marked to award positive achievement.

Marks are awarded for demonstrating the following interrelated **process skills**.

**Representing** Selecting the mathematics and information to model a situation.

- **R.1** Candidates recognise that a situation has aspects that can be represented using mathematics.
- **R.2** Candidates make an initial model of a situation using suitable forms of representation.
- **R.3** Candidates decide on the methods, operations and tools, including ICT, to use in a situation.
- **R.4** Candidates select the mathematical information to use.

**Analysing** Processing and using mathematics.

- **A.1** Candidates use appropriate mathematical procedures.
- **A.2** Candidates examine patterns and relationships.
- **A.3** Candidates change values and assumptions or adjust relationships to see the effects on answers in models.
- **A.4** Candidates find results and solutions.

**Interpreting** Interpreting and communicating the results of the analysis.

- **I.1** Candidates interpret results and solutions.
- **I.2** Candidates draw conclusions in light of situations.
- **I.3** Candidates consider the appropriateness and accuracy of results and conclusions.
- **I.4** Candidates choose appropriate language and forms of presentation to communicate results and solutions.

In particular, individual marks are mapped onto the following **skills standards**.

**Representing** Making sense of the situations and representing them.
A learner can:

- **Ra** Understand routine and non-routine problems in familiar and unfamiliar contexts and situations.
- **Rb** Identify the situation or problems and identify the mathematical methods needed to solve them.
- **Rc** Choose from a range of mathematics to find solutions.

**Analysing** Processing and using the mathematics.
A learner can:

- **Aa** Apply a range of mathematics to find solutions.
- **Ab** Use appropriate checking procedures and evaluate their effectiveness at each stage.

**Interpreting** Interpreting and communicating the results of the analysis.
A learner can:

- **Ia** Interpret and communicate solutions to multistage practical problems in familiar and unfamiliar contexts and situations.
- **Ib** Draw conclusions and provide mathematical justifications.

To facilitate marking, the following categories are used:

- **M** Method marks are awarded for a correct method which could lead to a correct answer.
- **A** Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
- **B** Marks awarded independent of method.
- **ft** Follow through marks. Marks awarded following a mistake in an earlier step.
- **SC** Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
- **oe** Or equivalent. Accept answers that are equivalent.
  eg, accept 0.5 as well as $\frac{1}{2}$

| Q | Answer | Mark | Comment |
|---|---|---|---|
| **1(a)** | 388 | B1<br>Aa | circled or indicated |
| **1(b)** | 3 × 52 or 156<br>or<br>4 × 65 or 260 | M1<br>Rb | 416 or 804 seen implies M1 |
| | their (156 + 260 + 388) × 5 ÷ 100<br>or<br>their 804 × 5 ÷ 100<br>or<br>40.2(0) | M1<br>Rc | or 0.95 seen<br>ft their 388 from (a)<br>their 804 must be an amount of money |
| | their 804 – their 40.2(0) (÷ 4) | M1<br>Aa | 0.95 × their 804 scores M2<br>allow if their 804 is **not** an amount of money |
| | 190.(95) and Yes<br>or<br>191 and Yes<br>or<br>804 and 763.(80) or 764 and Yes | A1ft<br>*Ib* | ft their 388 from (a) |
| | **Additional Guidance** | | |
| | their 804 can be their 156 or their 260 or their 416 or their 388<br>These answers score M3 A1ft | | |
| | their 388 = 378<br>188.(575) or 189 and Yes<br>794 and 754.(3) and Yes | their 388 = 410<br>196.(175) and Yes<br>826 and 784.(7) and Yes | their 388 = 508<br>219.(45) and No<br>924 and 877.(8) and No |
| | If 5% of their 804 is incorrect, the **3rd M1** can be awarded only if a method is seen. | | |
| | Forgetting their 388 → 98.8(0) scores M3A0 | | |
| | **Misreads** → allow these misreads only 29 or 111 for 65 and 28 or 105 for 52 | | |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| **1(c)** | Correctly uses mile values for km values totaling 960 km<br>e.g. 250 + 250 + 100 = 600 (miles)<br>150 × 4 = 600 (miles)<br>or<br>Correctly uses km values for mile values totaling 600 miles<br>eg 400 + 400 + 160 = 960 (km)<br>240 × 4 = 960 (km)<br>Correctly uses a conversion factor obtained from graph<br>e.g. 960 ÷ 80 × 50 = 600 (miles)<br>960 ÷ 240 × 150 = 600 (miles) | B2<br>*Rb*<br>*Ib* | B1 Attempts to use or incomplete use of<br>mile values for km values totaling 960<br>km values for mile values totaling 600<br>any conversion factor obtained from graph<br>For B1 allow all values ± ½ small square<br>SC1 1.6 or 0.625 seen or used with no evidence that the value has been obtained from the graph |
| | **Additional Guidance** | | |
| | 250 + 250 + 100 is obtained from 400km + 400km + 160km<br>150 × 4 is obtained from 240km<br>These values are the easiest to read accurately but any combination can be used.<br>**Award B1 for**<br>Correct method with inaccurate readings ± ½ square e.g. uses [395, 405] instead of 400<br>Correct method but the final '= 600' or '= 960' is not given or is worked out incorrectly | | |

| | | | |
|---|---|---|---|
| **1(d)** | their 600 ÷ 40 (× 5)<br>or<br>15 (× 5) | M1<br>Ra | or 960 ÷ [60, 70] (× 5) |
| | (£)75 | A1<br>Aa | |
| **Check** | reverse or alternative calculation | B1ft<br>Ab | eg 75 ÷ 5 × 40 = 600 |
| | **Additional Guidance** | | |
| | **Holistic marking**<br>Award marks for 1(d) if working seen in space for check<br>Award marks for check if seen in space for 1(d)<br>Treat contradictory work in both spaces as choice | | |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| 1(e) | stays at 3 or 4 different campsites including Point St Gilles | B1<br>Aa | not Caen |
| | distances correct and less than 5 hours (less than 375 km) | B1<br>Aa | allow if at least three different distances are given with a maximum of one incorrect |
| | return to Caen included | B1<br>Aa | can be > 375 km |
| | fully correct and clearly communicated plan including<br>3 or 4 different campsites named including Point St Gilles<br>all distances correct and < 375 km<br>journey from Caen both at start (can be implied by correct distance to 1st campsite) and end (must be named)<br>total number of nights at campsites given and equal to 14 | B2<br>Ia | B1 clearly communicated plan including<br>3 or 4 different campsites named<br>all distances attempted<br>number of nights at each campsite attempted<br>For B1<br>distances and number of nights can be incorrect<br>campsites need not include Point St Gilles |
| | **Additional Guidance** | | |
| | Ignore incorrect times if distances are given<br>Correct times imply correct distances and can score B4 if distances are not given<br>If La Croix Paris is the 1st campsite chosen a direct journey to a subsequent campsite is > 375km so maximum possible score is B1B0B1B1<br>**Visiting the same campsite more than once**<br>Counts only as one different campsite<br>If the journey to and from this campsite is the same<br>For final B2 → the distance need be given only once<br>For 2nd B1 → only counts as one distance | | |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| 2(a) | **Alternative Method 1** | | |
| | 150 × 1.25 or 187.5(0)<br>or<br>80 × 3.6(0) or 288<br>or<br>35 × 4.5(0) or 157.5(0) | M1<br>*Ra* | cost from one or more components |
| | their 187.5(0) + their 288 + their 157.5(0)<br>or 633 | M1<br>*Rb* | total cost from 3 components |
| | 150 × 1.8(0) or 270<br>and<br>30 × 5.2(0) or 156<br>and<br>20 × 6 or 120 | M1<br>*Aa* | income at normal prices<br>implied by 546 |
| | 6 – 0.6 × 6<br>or<br>0.4 × 6<br>or<br>2.4(0) | M1<br>*Aa* | reduced price of kettles |
| | (80 – 30) × 5.2(0) ÷ 2 or 130<br>and<br>(35 – 20) × their 2.4(0) or 36 | M1<br>*Ra* | income at reduced prices<br>166 implies M2<br>184 implies M1 |
| | their 270 + their 156 + their 120 + their 130 + their 36<br>or their 546 + their 166<br>or 712 | M1<br>*Rb* | total income from 5 components |
| | their 712 – their 633 / their 633 + 75 or 708 | M1<br>*Rc* | their 712 must be from at least 3 components |
| | 79 and Yes / 708 and 712 and Yes | A2<br>*Ib*<br>*Ib* | A1 79 or 708 and 712<br>A1ft correct decision based on their value<br>must score 2nd M1, 6th M1 and 7th M1 |
| | **Additional Guidance** | | |
| | 633 → M2 | 712 → M4 | 730 → M3 | | 97 and Yes → M6A1ft |

| Q | Answer | Mark | Comment |
|---|---|---|---|

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|---|---|---|---|
| **2(a)** | **Alternative Method 2** | | |
| | 1.8(0) – 1.25 or 0.55 | M1<br>*Ra* | profit per mug |
| | their 0.55 × 150 or 82.5(0) | M1<br>*Rb* | profit on mugs |
| | 6 – 0.6 × 6<br>or<br>0.4 × 6<br>or<br>2.4(0) | M1<br>*Aa* | reduced price of kettles |
| | (80 – 30) × 5.2(0) ÷ 2 or 130<br>and<br>(35 – 20) × their 2.4(0) or 36 | M1<br>*Aa* | income at reduced prices |
| | 80 × 3.6(0) – 30 × 5.2(0) – their 130<br>or 288 – 156 – their 130 or 2 | M1<br>*Ra* | loss on saucepans |
| | 35 × 4.5(0) – 20 × 6 – their 36<br>or 157.5(0) – 120 – their 36<br>or 1.5(0) | M1<br>*Rb* | loss on kettles |
| | their 82.5(0) – their 2 – their 1.5(0) | M1<br>*Rc* | total profit |
| | 79 and Yes | A2<br>*Ib*<br>*Ib* | A1 79<br>A1ft correct decision based on their value<br>must score 2nd M1, 6th M1 and 7th M1 |

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|---|---|---|---|---|---|
| | **Additional Guidance** | | | | |
| | 82.5 → M2 | 2 → M1 | 1.5(0) → M2 | 19.5(0) → M1 | 97 and Yes → M6A1ft |
| | | 2 and 1.5(0) → M4 | | | |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| 2(b) | Tom works for between 1 and 4 hours inclusive before 1 pm | B1<br>*Ra* | do not award if Tom appears on same row more than once |
| | Ali works for exactly 3 hours<br>and<br>Wes works for exactly 4 hours | B1<br>*Rb* | do not award if Ali or Wes appear on same row more than once |
| | all 5 work with nobody doing 5 or more consecutive hours | B1<br>*Ia* | do not award if rota is incomplete |
| | all 5 work and 3 different people at each hour | B1<br>*Ia* | do not award if rota is incomplete |
| | **Additional Guidance** | | |
| | Tom in more than once in the same row can score a maximum of B0B1B1B0 only<br>Ali or Wes in more than once in the same row can score a maximum of B1B0B1B0 only<br>Tom **and** Ali or Wes in more than once in the same row can score a maximum of B0B0B1B0 only | | |
| 3(a) | **Alternative Method 1** | | |
| | (6 × 3) + (2 × 4)<br>or 18 + 8<br>or 26 | M1<br>Ra | |
| | (their 18 + their 8) × 1500<br>or 39 000 | M1<br>Rb | |
| | their 39 000 ÷ 60 ÷ 60<br>or 650 ÷ 60<br>or 10.8(3 …) | M1<br>Rc | |
| | 10 hours 50 minutes | A1<br>Aa | |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| 3(a) | **Alternative Method 2** | | |
| | (6 × 3) and (2 × 4)<br>or 18 and 8 | M1<br>Ra | 26 implies M1 |
| | their 18 × 1500 or 27 000<br>and<br>their 8 × 1500 or 12 000 | M1<br>Rb | |
| | their 27 000 ÷ 60 ÷ 60<br>or 450 ÷ 60<br>or 7.5<br>and their 12 000 ÷ 60 ÷ 60<br>or 200 ÷ 60<br>or 3.3(3 …) | M1<br>Rc | |
| | 10 hours 50 minutes | A1<br>Aa | |
| | **Additional Guidance** | | |
| | 10.8(3 …) → M3 | 7.5 & 3.3(3 …) → M3 | 650 → M2 |

| Q | Answer | Mark | Comment |
|---|---|---|---|

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|---|---|---|---|---|---|
| **3(b)** | **Alternative Method 1** | | | | |
| | 1500 × 11 or 16500 | | M1<br>Ra | or 1500 × 0.11 or 165 | |
| | (1500 – their 1140) × 0.9<br>or<br>their 360 × 0.9<br>or 324 | (1500 – their 1140) × 50<br>or<br>their 360 × 50<br>or 18 000 | M1<br>Rb | (1500 – their 1140) × 0.9<br>or<br>their 360 × 0.9<br>or 324 | (1500 – their 1140) × 0.5(0)<br>or<br>their 360 × 0.5(0)<br>or 180 |
| | their 324 × 50 or 16 200 | their 18 000 × 0.9 or 16 200 | M1<br>Aa | their 324 × 0.5(0)<br>or 162 | or their 180 × 0.9<br>or 162 |
| | 16 500 and 16 200 and No<br>or<br>165 and 162 and No | | A2<br>Ib | A1 16 500 and 16 200 or 165 and 162<br>or<br>A1ft correct decision for their values<br>must score all three M marks | |

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|---|---|---|---|
| **3(b)** | **Alternative Method 2** | | |
| | 1500 × 11 or 16500 | M1<br>Ra | or 1500 × 0.11 or 165 |
| | (1500 – their 1140) × 0.9<br>or<br>their 360 × 0.9 or 324 | M1<br>Rb | |
| | their 16 500 ÷ their 324 | M1<br>Aa | or their 165 ÷ their 324 |
| | 50.9 … or 51 and No<br>or<br>0.509… or 0.51 and No | A2<br>Ib | A1 50.9 … or 51 or 0.509 … or 0.51<br>or<br>A1ft correct decision for their value<br>must score all three M marks |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| **3(b)** | **Alternative Method 3** | | |
| | 1500 × 11 or 16500 | M1<br>Ra | or 1500 × 0.11 or 165 |
| | (1500 – their 1140) × 0.9<br>or<br>their 360 × 0.9 or 324 | M1<br>Rb | |
| | their 16 500 ÷ 50 or 330 | M1<br>Aa | or their 165 ÷ 0.5(0) or 330 |
| | 324 and 330 and No | A2<br>Ib | A1 324 and 330<br>or<br>A1ft correct decision for their values<br>must score all three M marks |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| **3(b)** | **Alternative Method 4** | | |
| | 1500 × 11 or 16 500 | M1<br>Ra | or 1500 × 0.11 or 165 |
| | (1500 – their 1140) × 50 or 18 000 | M1<br>Rb | or (1500 – their 1140) × 0.5(0) or 180 |
| | their 16 500 ÷ their 18 000 (× 100) | M1<br>Aa | or their 165 ÷ their 180 (× 100) |
| | 91.6(6 …) or 91.67 or 91.7 and No | A2<br>Ib | A1 91.6(6 …) or 91.67 or 91.7 and No<br>or<br>A1ft correct decision for their values<br>must score all three M marks |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| 3(c) | 12 × 4 + 13 × 8 + 14 × 16 + 15 × 12 + 16 × 7 + 17 × 2 + 18 × 1 = 720<br>or<br>48 + 104 + 224 + 180 + 112 + 34 +18 = 720 | B2<br>Ib | B1 Allow up to three errors or omissions |
| | **Additional Guidance** | | |
| | Working may be next to table<br>Omitting '= 720' is an omission | | |

| | | | | |
|---|---|---|---|---|
| 3(d) | **Alternative Method 1** | | | |
| | 720 ÷ 50 or 14.4 | 450 ÷ 50 or 9 | M1<br>Rb | |
| | their 14.4 × 450 | their 9 × 720 | M1<br>Aa | |
| | 6480 and Yes | | A2<br>Ib | A1 6480<br>or<br>A1ft correct decision for their value<br>must score M2<br>decision should be yes if<br>their 6480 = [6450, 6550] |

| | | | |
|---|---|---|---|
| 3(d) | **Alternative Method 2** | | |
| | 720 ÷ 50 or 14.4 | M1<br>Rb | |
| | 6500 ÷ their 14.4 | M1<br>Aa | |
| | 451 or 451.3 … or 451.4 and Yes | A2<br>Ib | A1 451 or 451.3 … or 451.4<br>or<br>A1ft correct decision for their values<br>must score M2<br>decision should be yes if<br>their 451.3 = [447.9, 454.9] |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| 3(d) | **Alternative Method 3** | | |
| | their 720 ÷ 50 or 14.4 | M1<br>Rb | |
| | 6500 ÷ 450 or 14.44(4 …) | M1<br>Aa | |
| | 14.44(4 …) and 14.4 and Yes | A2<br>Ib | A1 14.44(4 …) and 14.4<br>or<br>A1ft correct decision for their values<br>must score M2<br>decision should be yes if<br>their 14.44(4 …) = [14.3, 14.6] |
| 3(d) | **Alternative Method 4** | | |
| | 450 ÷ 50 or 9 | M1<br>Rb | |
| | 6500 ÷ their 9 | M1<br>Aa | |
| | 722.(2 …) and Yes | A2<br>Ib | A1 722.(2 …)<br>or<br>A1ft correct decision for their values<br>must score M2<br>decision should be yes if<br>their 722.(2 …) = [716.6, 727.7] |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| 3(d) | **Alternative Method 5** | | |
| | 450 ÷ 50 or 9 | M1<br>Rb | |
| | 6500 ÷ 720 or 9.02(7 …) or 9.028 or 9.03 | M1<br>Aa | |
| | 9 and 9.02(7 …) or 9.028 or 9.03 and Yes | A2<br>Ib | A1 9 and 9.02(7 …) or 9.028 or 9.03<br>or<br>A1ft correct decision for their values must score M2<br>decision should be yes if their 9.02(7 …) = [8.958, 9.097] |

| Q | Answer | Mark | Comment | |
|---|---|---|---|---|
| **4(a)** | 530 + 120 or 650 | M1<br>*Ra* | | 530 × 10 or 5300 and 120 × 10 or 1200<br>or<br>530 × 11 or 5830 and 120 × 11 or 1320 |
| | 7100 ÷ their 650<br>or<br>their 650 × 10 = 6500<br>or<br>their 650 × 11 = 7150 | M1<br>*Rc* | their 650 can be 410<br>their 650 cannot be 530 or 120 | their 5300 + their 1200 or 6500<br>or<br>their 5830 + their 1320 or 7150 |
| | 10.9 … or 11 | A1<br>*Aa* | SC1 17.3 … | |

| | | | |
|---|---|---|---|
| **4(a) Check** | reverse calculation<br>7100 ÷ 10.9 … = 650<br>and<br>650 – 120 = 530<br>or<br>7100 ÷ 11 = 645. (45) (allow 650)<br>And<br>645.(45) – 530 = 125.(45)<br>or<br>650 – 530 = 120<br>or<br>alternative method | B1ft<br>*Ab* | or 7150 ÷ 11 = 650<br>or<br>6500 ÷ 10 = 650<br>and<br>650 – 120 = 530<br>ft their values |

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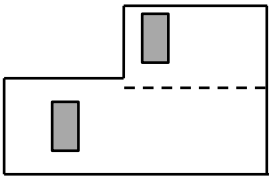
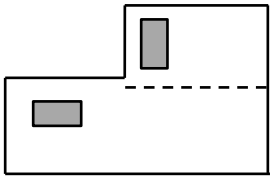
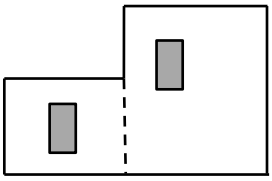
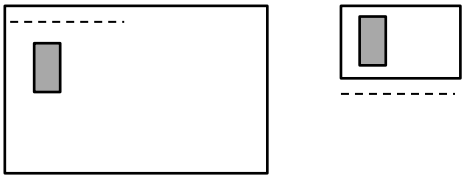
|---|---|
| **4(a)** | **Additional Guidance** |
| | **Holistic marking**<br>Award marks for 4(a) if working seen in space for check<br>Award marks for check if seen in space for 4(a)<br>Treat contradictory work in both spaces as choice<br>**Note** that 650 × 11 = 7150 (oe) on its own is only a valid check if it is an alternative method.<br>To score as a reverse method it also needs 650 – 530 = 120 (oe) |

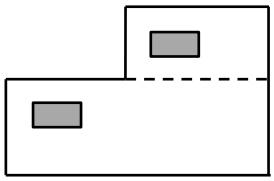
| Q | Answer | Mark | Comment |
|---|---|---|---|
| **4(b)** | 16 × 250 ÷ 1000 = 4 (kW)<br>or<br>16 × 250 = 4000 watts = 4 kilowatts<br>or<br>(4 kW =) 4000 w<br>and<br>4000 ÷ 250 =16 or 250 × 16 = 4000<br>or<br>250 × 4 = 1 kW<br>and<br>4 × 4 = 16 | B1<br>*Ib* | or 250 ÷ 1000 = 0.25 (kW)<br>and<br>4 ÷ 0.25 = 16 or 16 × 0.25 = 4 |
| | **Additional Guidance** | | |
| | Award only if a clear connection between watts and kilowatts is seen<br>This could either be through correct use of 1000 or correct use of units | | |
| **4(c)** | 0.5 × 10.3 + 4.5<br>or<br>5.15 + 4.5<br>or<br>9.65 | M1<br>*Ra* | Step 1 |
| | their 9.65 × 4 × 0.35 or 13.51 | M1<br>*Rc* | Step 2 |
| | 31 × their 13.51 | M1<br>*Aa* | Step 3<br>allow 30 × their 13.51 or 405.3 |
| | 418.(81) or 419 and Yes | A2<br>*Ib* | A1 418.(81) or 419<br>A1ft Correct conclusion from their value<br>Must score at least two M marks |

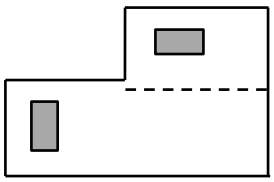
| Q | Answer | Mark | Comment |
|---|---|---|---|
| **4(d)** | **Alternative Method 1** | | |
| | For the arrangement of panels shown<br>Can score a maximum of M3A2  | | |
| | 6.8 ÷ 1.082 or 6.28 … or 6<br>or<br>3.7 ÷ 1.575 or 2.34 … or 2<br>or<br>4.6 ÷ 1.082 or 4.25 … or 4 | M1<br>*Ra* | allow clear indication of correct integer values on diagram |
| | 6.8 ÷ 1.082 or 6.28 … or 6<br>and<br>3.7 ÷ 1.575 or 2.34 … or 2<br>and<br>4.6 ÷ 1.082 or 4.25 … or 4 | M1<br>*Aa* | |
| | their 6 × their 2 | M1<br>*Aa* | must use integers<br>allow correct integer answer |
| | 6 × 2 + 4 = 16 and Yes | A2<br>*Ia*<br>*Ib* | A1 6 × 2 + 4 = 16<br>A1ft correct conclusion from their values must score M3 |
| | **Additional Guidance** | | |
| | See extra sheet for possible arrangements that do **not** give 16 panels<br>Correct bottom section only → M1M0M1A0<br>**Contradiction between the diagram and working lines** → mark working lines | | |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| 4(d) | **Alternative Method 2** | | |
| | For the arrangement of panels shown<br>Can score a maximum of M3A2  | | |
| | 6.8 ÷ 1.575 or 4.31 … or 4<br>or<br>3.7 ÷ 1.082 or 3.41 … or 3<br>or<br>4.6 ÷ 1.082 or 4.25 … or 4 | M1<br>*Ra* | allow clear indication of correct integer values on diagram |
| | 6.8 ÷ 1.575 or 4.31 … or 4<br>and<br>3.7 ÷ 1.082 or 3.41 … or 3<br>and<br>4.6 ÷ 1.082 or 4.25 … or 4 | M1<br>*Aa* | |
| | their 4 × their 3 | M1<br>*Aa* | must use integers<br>allow correct integer answer |
| | 4 × 3 + 4 = 16 and Yes | A2<br>*Ia*<br>*Ib* | A1 6 × 2 + 4 = 16<br>A1ft correct conclusion from their values must score M3 |
| | **Additional Guidance** | | |
| | See extra sheet for possible arrangements that do **not** give 16 panels<br>Correct bottom section only → M1M0M1A0<br>**Contradiction between the diagram and working lines** → mark working lines | | |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| 4(d) | **Alternative Method 3** | | |
| | For the arrangement of panels shown<br>Can score a maximum of M3A2  | | |
| | 2.2 ÷ 1.082 or 2.03 … or 2<br>or<br>3.7 ÷ 1.575 or 2.34 … or 2<br>or<br>4.6 ÷ 1.082 or 4.25 … or 4<br>or<br>5 ÷ 1.575 or 3.17 … or 3 | M1<br>*Ra* | allow clear indication of correct integer values on diagram |
| | 2.2 ÷ 1.082 or 2.03 … or 2<br>and<br>3.7 ÷ 1.575 or 2.34 … or 2<br>and<br>4.6 ÷ 1.082 or 4.25 … or 4<br>and<br>5 ÷ 1.575 or 3.17 … or 3 | M1<br>*Aa* | |
| | their 2 × their 2<br>or<br>their 4 × their 3 | M1<br>*Aa* | must use integers<br>allow correct integer answer |
| | 2 × 2 + 4 × 3 = 16 and Yes | A2<br>*Ia*<br>*Ib* | A1 2 × 2 + 4 × 3 = 16<br>A1ft correct conclusion from their values<br>must score M3 |
| | **Additional Guidance** | | |
| | See extra sheet for possible arrangements that do **not** give 16 panels<br>Any one correct section only → M1M0M1A0<br>**Contradiction between the diagram and working lines** → mark working lines | | |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| 4(d) | **Alternative Method 4** | | |
| | For the arrangement of panels shown<br>Can score a maximum of M3A2  | | |
| | 6.8 ÷ 1.082 or 6.28 … or 6<br>or<br>5 ÷ 1.575 or 3.27 … or 3<br>or<br>2.2 ÷ 1.082 or 2.03 … or 2 | M1<br>*Ra* | allow clear indication of correct integer values on diagram |
| | 6.8 ÷ 1.082 or 6.28 … or 6<br>and<br>5 ÷ 1.575 or 3.27 … or 3<br>and<br>2.2 ÷ 1.082 or 2.03 … or 2 | M1<br>*Aa* | |
| | their 6 × their 3 | M1<br>*Aa* | must use integers<br>allow correct integer answer |
| | 6 × 3 – 2 = 16 and Yes | A2<br>*Ia*<br>*Ib* | A1 6 × 3 – 2 = 16<br>A1ft correct conclusion from their values must score M3 |
| | **Additional Guidance** | | |
| | See extra sheet for possible arrangements that do **not** give 16 panels<br>Correct large rectangle only → M1M0M1A0<br>**Contradiction between the diagram and working lines** → mark working lines | | |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| 4(d) | **Alternative Method 5** | | |
| | For the arrangement of panels shown<br>Can score a maximum of M3A1  | | |
| | 6.8 ÷ 1.575 or 4.31 … or 4<br>or<br>3.7 ÷ 1.082 or 3.41 … or 3<br>or<br>4.6 ÷ 1.575 or 2.92 … or 2 | M1<br>*Ra* | allow clear indication of correct integer values on diagram |
| | 6.8 ÷ 1.575 or 4.31 … or 4<br>and<br>3.7 ÷ 1.082 or 3.41 … or 3<br>and<br>4.6 ÷ their 1.575 or 2.92 … or 2 | M1<br>*Aa* | |
| | their 4 × their 3 | M1<br>*Aa* | must use integers<br>allow correct integer answer |
| | 4 × 3 + 2 = 14 and No | A1<br>*Ia* | |
| | **Additional Guidance** | | |
| | See extra sheet for other possible arrangements that can score M1M1M1A1 max<br>Correct bottom section only → M1M0M1A0<br>**Contradiction between the diagram and working lines** → mark working lines | | |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| 4(d) | **Alternative Method 6** | | |
| | For the arrangement of panels shown<br>Can score a maximum of M3A1  | | |
| | 6.8 ÷ 1.082 or 6.28 … or 6<br>or<br>3.7 ÷ 1.575 or 2.349 … or 2<br>or<br>4.6 ÷ 1.575 or 2.92 … or 2 | M1<br>*Ra* | allow clear indication of correct integer values on diagram |
| | 6.8 ÷ 1.082 or 6.28 … or 6<br>and<br>3.7 ÷ 1.575 or 2.349 … or 2<br>and<br>4.6 ÷ 1.575 or 2.92 … or 2 | M1<br>*Aa* | |
| | their 6 × their 2 (+ their 2) | M1<br>*Aa* | must be integers<br>allow correct integer answer |
| | 6 × 2 + 2 = 14 and No | A2<br>*Ia* | |
| | **Additional Guidance** | | |
| | See extra sheet for other possible arrangements that can score M1M1M1A1 max<br>Correct bottom section only → M1M0M1A0<br>**Contradiction between the diagram and working lines** → mark working lines | | |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| **4(e)** | **Alternative Method 1** | | |
| | ($P$ =) 0.1768 × (6502 – 3463)<br>or<br>($P$ =) 0.1768 × 3039<br>or<br>537.29(52) | M1<br>*Ra* | 3039 can be 9965 |
| | £537.30 | A1<br>*Ib* | must see £ symbol |
| | **Alternative Method 2** | | |
| | ($P$ =) 0.1768 × 6502<br>– 0.1768 × their 3463<br>or<br>($P$ =) their 1149.55(36)<br>– their [612.25, 612,26]<br>or<br>537.29(52) | M1<br>*Ra* | allow their 1149.55(36)<br>+ their [612.25, 612,26] |
| | £537.30 | A1<br>*I* | must see £ symbol |
| | **Additional Guidance** | | |
| | Need **both** £ symbol **and** rounded to 537.30 for M1A1<br>Condone £537.30p | | |