

8300

## GCSE MATHEMATICS

Foundation and Higher tier – Questions by Topic – Mark Scheme

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Number

Finding percentages of amounts without a calculator

v1.0

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# Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics papers, marks are awarded under various categories.

If a student uses a method which is not explicitly covered by the mark scheme the same principles of marking should be applied. Credit should be given to any valid methods. Examiners should seek advice from their senior examiner if in any doubt

|                        |                                                                                                                                       |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>M</b>               | Method marks are awarded for a correct method which could lead to a correct answer.                                                   |
| <b>A</b>               | 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>B</b>               | Marks awarded independent of method.                                                                                                  |
| <b>ft</b>              | Follow through marks. Marks awarded for correct working following a mistake in an earlier step.                                       |
| <b>SC</b>              | Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.                       |
| <b>M dep</b>           | A method mark dependent on a previous method mark being awarded.                                                                      |
| <b>B dep</b>           | A mark that can only be awarded if a previous independent mark has been awarded.                                                      |
| <b>oe</b>              | Or equivalent. Accept answers that are equivalent.<br>e.g. accept 0.5 as well as $\frac{1}{2}$                                        |
| <b>[a, b]</b>          | Accept values between a and b inclusive.                                                                                              |
| <b>3.14...</b>         | Allow answers which begin 3.14 e.g. 3.14, 3.142, 3.1416                                                                               |
| <b>Use of brackets</b> | It is not necessary to see the bracketed work to award the marks.                                                                     |

Examiners should consistently apply the following principles

### **Diagrams**

Diagrams that have working on them should be treated like normal responses. If a diagram has been written on but the correct response is within the answer space, the work within the answer space should be marked. Working on diagrams that contradicts work within the answer space is not to be considered as choice but as working, and is not, therefore, penalised.

### **Responses which appear to come from incorrect methods**

Whenever there is doubt as to whether a student has used an incorrect method to obtain an answer, as a general principle, the benefit of doubt must be given to the student. In cases where there is no doubt that the answer has come from incorrect working then the student should be penalised.

### **Questions which ask students to show working**

Instructions on marking will be given but usually marks are not awarded to students who show no working.

### **Questions which do not ask students to show working**

As a general principle, a correct response is awarded full marks.

### **Misread or miscopy**

Students often copy values from a question incorrectly. If the examiner thinks that the student has made a genuine misread, then only the accuracy marks (A or B marks), up to a maximum of 2 marks are penalised. The method marks can still be awarded.

### **Further work**

Once the correct answer has been seen, further working may be ignored unless it goes on to contradict the correct answer.

### **Choice**

When a choice of answers and/or methods is given, mark each attempt. If both methods are valid then M marks can be awarded but any incorrect answer or method would result in marks being lost.

### **Work not replaced**

Erased or crossed out work that is still legible should be marked.

### **Work replaced**

Erased or crossed out work that has been replaced is not awarded marks.

### **Premature approximation**

Rounding off too early can lead to inaccuracy in the final answer. This should be penalised by 1 mark unless instructed otherwise.

**Q1.**

Complete, correct build up method  
or  $0.51 \times 400$       *eg*  $400 \div 2 + 400 \div 100$     *oe*

204

**M1**

**A1**

[2]

**Q2.**

$0.8 \times 300$       *oe*  
*eg Complete build-up*

240

*SC1 Answer 60*

**M1**

**A1**

[2]

**Q3.**

(a) 60

(b) 39      *Condone %*

**B1**

**B1**

[2]

**Q4.**

Method for finding 1% or a multiple of 5%  
or  
 $1200 \times 35$     or    42 000  
or  
0.35

*may be implied by a correct value*

**M1**

Fully correct method that would lead to the correct answer

**M1dep**

420

*SC2 780*

*SC1 digits 42*

**A1**

**Additional Guidance**

Values or methods assigned to a percentage must be correct

Ignore a % sign after answer

[3]

**Q5.**

(a) 35

(b)  $920 \div 100 \div 2$

*oe*  $9.2 \div 2$        $920 \times 0.005$

4.6

**B1**

**M1**

**A1**

[3]

**Q6.**

54

**B1**

**[1]**

**Q7.**

(a)  $0.6 \times 35$

*oe or build up method*

**M1**

21

*SC1 14*

**A1**

(b)  $150 \div 5 \times 4$

*Oe*

*Or 30 seen*

**M1**

120

**A1**

**[4]**

**Q8.**

$14\,000 \times 0.2$

or

$14\,000 \div 10 \times 2$

or

$(10\% =) 1400$

or

$(1\% =) 140$

*oe*

*eg  $14\,000 \div 5$*

20

100  $\times 14\,000$

**M1**

2800

*oe eg 2800.00*

**A1**

**Additional Guidance**

2800 followed by  $14\,000 - 2800$  (implied by 11 200)

**M1A0**

$14\,000 \div 10 = 4000$  followed by  $4000 \times 2 = 6000$  (fully correct method)

**M1A0**

$14\,000 \div 10 = 4000$  followed by  $20\% = 8000$  (method not shown for 20% but it is correct for  $2 \times$  their 10%)

**M1A0**

$14\,000 \div 10 = 4000$  followed by  $20\% = 6000$  (method not shown for 20%)

**M0A0**

$10\% = 140$ ,  $140 \times 2 = 280$  (method not shown for 10%)

**M0A0**

$14 \div 5$  or 2.8 (without place value adjustment)

**M0A0**

**[2]**

**Q9.**

**Alternative method 1**

$300 \div 10$  or  $30$  oe

**M1**

their  $30 \times 6.5$

or their  $30 \times 6 + \text{their } 30 \div 2$

or  $300 - \text{their } 30 \times 3.5$

or

$300 - (\text{their } 30 \times 3 + \text{their } 30 \div 2)$

oe

**M1dep**

195

SC2 105

**A1**

**Alternative method 2**

$300 \div 100$  or  $3$  oe

**M1**

their  $3 \times 65$  or  $300 - \text{their } 3 \times 35$

oe

**M1dep**

195

SC2 105

**A1**

**Alternative method 3**

Correct method to work out any multiple of 5% of 300 up to 95%

e.g.  $50\% = 300 \div 2$

**M1**

Fully correct build-up method to work out 65% of 300

e.g.  $300 \div 2 + 3 \times 300 \div 20$

or  $150 + 3 \times 15$

(no errors seen)

**M1dep**

195

SC2 105

**A1**

**Alternative method 4**

$65 \div 100$  or  $0.65$  or  $65 \times 300$

or 19 500

**M1**

$300 \times \frac{65}{100}$  or  $300 \times \text{their } 0.65$

or their  $19\,500 \div 100$  oe

**M1dep**

195

SC2 105

**A1**

**Additional Guidance**

In Alt 3, either a correct method or a correct value must be seen for the first M1

Note that  $300 \times 50\%$  is not allowed as a correct method

If Alt 3 is to be used, the percentage that is attempted must be stated e.g.  $20\% = 300 \div 5$

Do not ignore further working for the A mark

e.g.  $300 - 195$

**M1M1A0**

**[3]**

**Q10.**

$$\frac{110}{100} \times 80$$

or

(10% =) 8

oe eg  $80 + \frac{1}{10} \times 80$  or  $80 + 8$   
or  $8 \times 11$  or  $110 \times 0.8$  or  $1.1 \times 80$   
or 72 (implies 8)

88

**M1**

**A1**

**Additional Guidance**

88% as answer

**M1A0**

**[2]**

**Q11.**

- (a) Ticks 'No' and gives correct explanation indicating her error

*eg It should be 0.03  
0.3 would give 30%  
It's 10 times too big  
You need to divide by 10 as well*

**B1**

**Additional Guidance**

'Yes' ticked

**B0**

If 'No' is not ticked, explanation must include a decision that the statement is incorrect  
'No' not ticked and 'it should be 0.03' (only implies 'No')

**B0**

'No' not ticked and 'it should be 0.03 so she is wrong'

**B1**

It is not sufficient to only show a different correct method,  
eg 'No' and 'divide by 100 and multiply by 3'

**B0**

eg 'No' and 'she has divided by 10 and multiplied by 3 but she should have divided by 100 then multiplied by 3'

**B1**

'No' and '1700  $\times$  0.03' (a correction of Laura's method)

**B1**

Calculating the correct answer must come with the correct evaluation of Laura's method  
eg 'No' and 'should be 51'

**B0**

eg 'No' and 'Laura gets 510 but it should be 51'

**B1**

- (b) Ticks 'No' and gives correct explanation

*Eg  $\frac{30}{29}$  is bigger than 1  
58 is from  $\frac{30}{29}$  the answer would have to be bigger than 60 it will be a decimal*

**B1**

**Additional Guidance**

'Yes' ticked

**B0**

'60 doesn't divide by 29' oe

**B0**

'No' ticked and 'the numerator and denominator are wrong way round'

**B1**

If 'No' is not ticked, explanation must include a decision that the statement is incorrect  
'No' not ticked and 'it should be more than 60' (only implies 'No')

**B0**

'No' not ticked and 'it should be more than 60 so she is wrong'

**B1**

'No' ticked and  $60 \div 29 = 2.(...)$  then  $2.(...) \times 30 = [60, 70)$   
accept 2 r2 for 2.(...)

**B1**

'No' ticked and  $30 \div 29 = 1.(...)$  and  $1.(...) \times 60 = [60, 70)$   
accept 1 r1 for 1.(...)

**B1**

'No' ticked and 'because it's a top heavy fraction'

**B0**

'No' ticked and 'because it's a top heavy fraction so it's bigger than 1'

**B1**

'No' ticked and  $'1\frac{1}{29} \times 60'$

**B0**

'No' ticked and  $'1\frac{1}{29} \times 60'$  so the answer is over 60'

**B1**

**[2]**

**Q12.**

$$1.5 \times 36$$

or

$$36 + 36 \div 2$$

54

**M1**

**A1**

**[2]**

**Q13.**

$$\frac{50}{100} \times 14 \text{ or } 7$$

*oe eg 14 ÷ 2*

**M1**

$$14 - 5 + 1 \text{ or } 10$$

or

$$\text{their } 7 - 5 + 1 \text{ or } 3$$

**M1**

*oe*

*their 7 must be an integer,  
where  $4 < \text{their } 7 < 14$   
3 implies M1M1*

$$\frac{3}{10}$$

or

$$3 : 7$$

*oe*

**A1**

30

*ft their  $\frac{3}{10}$  correctly converted to a percentage*

**B1ft**

**Additional Guidance**

For the B1ft, their percentage must be correct to 2sf or better  
30 on the answer line with no incorrect working

**M2A1B1**

3 in 10 or 3 out of 10

**M2A1**

3 : 10

**M2A0**

7 - 5 = 3 + 1 = 4, answer 40 (10 implied)

**M2A0B1ft**

**[4]**

**Q14.****Alternative method 1 - total cost then reduction**

$55 \times 6$  or 330 oe

**M1**

their 330  $\div 10$  or 33 oe

**M1dep**

their 330 – their 33  
or 297

oe dep on M2  
 $55 \times 6 \times 0.9$  implies M3

**M1dep**

2.97 or 297p

condone £2.97p

**A1****Alternative method 2 - reduction then total cost**

$55 \div 10$  or 5.5 oe

**M1**

55 – their 5.5 or 49.5

oe  $55 \times 0.9$  implies M2

**M1dep**

their 49.5  $\times 6$   
or  
297

oe  
dep on M2

**M1dep**

2.97 or 297p

condone £2.97p

**A1****Alternative method 3 - buying 10% fewer bags**

$6 \div 10$  or 0.6

oe

**M1**

6 – their 0.6 or 5.4

oe  $6 \times 0.9$  implies M2

**M1dep**

their 5.4  $\times 55$   
or  
297

oe  
dep on M2

**M1dep**

2.97 or 297p

condone £2.97p

**A1****Additional Guidance**

Working may be in £ or p or a mixture for up to M3

Ignore units for up to M3

Use the Alt that awards the best mark

Allow a maximum of one error in each build-up method

**[4]**

**Q15.**

$$\frac{20}{100} \times 50 \text{ or } 10$$

oe

**M1**

2

*SC1 for 32*

**A1**

**[2]**

**Q16.**

$$345 - 96 \text{ or } 249$$

**M1**

$$80 \div 10 \times 3 \text{ or } 24$$

oe

**M1**

$$\text{their } 249 \div \text{their } 24$$

or

$$\text{their } 24 \times 10 \text{ or their } 24 \times 11$$

*Condone 345  $\div$  24*

**M1**

11

**A1**

**[4]**

**Q17.**

$$600 \div 4 (= 150) \text{ oe}$$

**M1**

$$\frac{40}{100} \times 600 (= 240) \text{ oe}$$

**M1**

$$\text{their } 150 + \text{their } 240 (= 390)$$

$$600 - \text{their } 150 (= 450)$$

$$\text{or } 600 - \text{their } 240 (= 360)$$

**M1**

$$600 - \text{their } 390$$

$$\text{their } 450 - \text{their } 240$$

$$\text{or their } 360 - \text{their } 150$$

**M1**

$$210$$

**A1**

**Alternative method 1**

$$25(\%)$$

$$0.25$$

**M1**

$$\text{their } 25(\%) + 40(\%) (= 65(\%))$$

$$\text{their } 0.25 + 0.4(0) (= 0.65)$$

**M1**

$$100(\%) - \text{their } 65(\%) (= 35(\%))$$

$$1 - \text{their } 0.65 (= 0.35)$$

**M1**

$$\frac{\text{their } 35(\%)}{100} \times 600 \text{ oe}$$

$$0.35 \times 600$$

**M1**

$$210$$

**A1**

**Alternative method 2**

$$\frac{2}{5} \text{ or } \frac{40}{100} \text{ oe}$$

**M1**

$$\text{their } \frac{5}{20} + \text{their } \frac{8}{20} \text{ oe}$$

*makes common denominators with at least 1 correct numerator*

**M1**

$$1 - (\text{their } \frac{5}{20} + \text{their } \frac{8}{20}) = (\frac{7}{20})$$

**M1 dep**

$$\text{their } \frac{7}{20} \times 600 \text{ oe}$$

**M1**

$$210$$

**A1**

**[5]**

**Q18.**

$30 \times 80$  or  $30 \times 0.8$  or 2400 or 24

*Ignore units*

**M1**

their  $24 \div 10 \times 2$  or 4.8(0) oe

or

*correct method to find 20% of their 2400 or 24*

their 2400

10  $\times 2$  or 480

*$80 \div 10 \times 2 \times 30$  implies M2*

or

$80 \div 10 \times 2 \times 30$  or 480

**M1**

their 2400 – their 480

*dep on 2nd M1*

or

their 24 – their 4.8(0)

**M1dep**

£19.20 or 1920p

*Strand (i) correct money notation*

*Do not accept 19.20 or £19.20p or £19.2*

*ft only with answer as a multiple of 10p*

*ft is not allowed with M3 awarded*

**Q1ft**

**Alternative Method**

80

$80 \times 0.2$  or 10  $\times 2$  or 16 oe

*Correct method to find 20% of 80*

**M1**

80 – their 16 or 64

*Ignore units*

**M1**

their  $64 \times 30$

*dep on 2nd M1*

**M1dep**

£19.20 or 1920p

*Strand (i) correct money notation*

*Do not accept 19.20 or £19.20p or £19.2*

*ft only with answer as a multiple of 10p*

*ft is not allowed with M3 awarded*

**Q1ft**

**[4]**

**Q19.**

6.5 or 3.25 seen

**M1**

9.75 or 6.5 + 3.25

or 65 – (6.5 + their 3.25)

or 65 – (their 6.5 + 3.25)

**M1dep**

55.25

**A1**

**Alternative method 1**

$0.15 \times 65$  oe

**M1**

9.75

or 65 – their  $(0.15 \times 65)$  oe

**M1dep**

55.25

**A1**

**Alternative method 2**

0.85 oe

**M1**

$0.85 \times 65$  oe

**M1dep**

55.25

**A1**

[3]

**Q20.**

**Alternative method 1**

$4000 \times 250$  or 1 000 000

**M1**

$4000 \times 0.2$  or 800 or 1.2 seen oe

**M1**

$4000 \times 1.2$  or 4800

**M1**

their  $4800 \times 200$  or 960 000

*dep on second and third M*

**M1dep**

1 000 000

and 960 000

and decrease

**A1**

**Alternative method 2**

$1 - 0.2$  or 0.8

**M1**

$1 + 0.2$  or 1.2

**M1**

$0.8 \times 1.2$

*dep on M2*

**M1dep**

0.96

**A1**

0.96 and decrease

**A1**

[5]

**Q21.**

$$\frac{170}{100} \times 20 \text{ or } \frac{170}{10} \times 2 \text{ or } 17 \times 2 \text{ or } 34$$

or

$$\frac{170}{100} \times 80 \text{ or } \frac{170}{10} \times 8$$

oe

(Tablet World)

**M1**

136

**A1**

180 ÷ 4 or 45

or

$$180 \times \frac{3}{4}$$

oe

(IT Supplies)

**M1**

135

**A1**

138

(PC Heaven)

**B1**

IT Supplies

Strand (iii)

ft for correct decision based on their values, must have both method marks and a total for PC Heaven

**Q1ft**

**[6]**

**Q22.**

60 seen

**B1**

$$\text{their } 60 - \frac{20}{100} \times \text{their } 60 \text{ or } 48$$

$$\text{oe eg } \frac{80}{100} \times \text{their } 60$$

**M1**

Yes and 48 seen

Using 70 and getting 56,

hence 'no' scores M1 A1

56 with no conclusion is M1A0

SC1 for 12 and Yes

**A1 ft**

**[3]**

**Q23.**

$$400 \times 1.07$$

**B1**

**[1]**

**Q24.**

$$250 \times 0.85$$

**B1**

**[1]**

**Q25.**

$$(6800 \div 10) + (6800 \div 100) \times 2$$
$$(= 816)$$

$$680 + 2 \times 68$$
$$6800 \times 0.12$$

**M1**

6800 + their 816

$$6800 \times 1.12 \text{ gets M2}$$

**M1 dep**

7616

**A1**

**[3]**

**Q26.**

$$\frac{30}{100} \times 4 \text{ or } 1.2(0) \text{ or } 120$$
$$\frac{70}{100}$$

or  $\frac{70}{100}$

oe

**M1**

4 – their 1.2(0) or 2.8

$$\frac{70}{100} \times 4$$

oe

**M1dep**

(£) 2.80

*Strand (i) Must have correct units  
do not accept 2.80p or 280p or 2.8*

**Q1**

**[3]**