



GCSE Foundation/Higher 08

Number



Mark scheme



156 minutes



134 marks

Solving numerical problems

M1. $\frac{1}{3}$ or $\frac{3}{4}$ or $1 - \frac{2}{3}$ or $1 - \frac{1}{4}$ seen
oe

M1

$$18 = \frac{3}{4} \quad \text{or} \quad \frac{1}{4} = 6 \quad \text{or} \quad \frac{1}{3} = 6$$

$$\text{or} \quad \frac{1}{2} \quad \text{or} \quad 6 \times 3 (= 18)$$

$$\text{or} \quad \frac{2}{3} \times \frac{3}{4} \quad \text{seen}$$

M1 dep

$$6 \times 4 \quad \text{or} \quad \frac{\text{their } 18}{3} \times 4 \quad \text{or} \quad 18 + 6$$

Calculation leading to a final answer of 24

M1 dep

24

SC1 for 11 12

SC2 for 72

$$(\pounds)6 = \frac{2}{3} \rightarrow (\pounds)9$$

$$\text{then } \frac{9 \times 4}{3} = 12 \quad \text{is SC3}$$

A1

[3]

M2. 100×0.84 or $60 \times 1.1(0)$
84 or 66 or 150
Money out

M1

$$\text{their } 150 \times 1.4 (= 210)$$

oe dep on first M1

Required total sales income

M1 dep

$100 \times 1.2(0)$ or $40 \times 1.6(0)$
120 or 64 or 184
Money in after 40 packs sold

M1

$(\text{their } 210 - \text{their } 184) \div 20$
dep on 2nd and 3rd M1
Money needed $\div 20$

M1 dep

1.30
Do not accept 1.3

A1

Alternative method 1

100×0.84 or $60 \times 1.1(0)$
84 or 66 or 150
Money out

M1

$100 \times 1.2(0)$ or $40 \times 1.6(0)$
120 or 64 or 184
Money in after 40 packs sold

M1

their 184 – their 150
34 if correct dep on
1st and 2nd M1
Profit after 40 packs sold

M1 dep

$(0.4 \times \text{their } 150 - \text{their } 34) \div 20$
dep on 3rd M1
Money needed $\div 20$

M1 dep

1.30
Do not accept 1.3

A1

Alternative method 2

100×0.84 or $60 \times 1.1(0)$
84 or 66 or 150
Money out

M1

100×0.36 or 40×0.50
36 or 20 or 56
Profit so far

M1

$$(0.4 \times \text{their } 150 - \text{their } 56) \div 20$$

0.20 if correct dep on 1st and 2nd M1

Profit per pack needed

M1 dep

$$\text{their } 0.20 + 1.10$$

dep on 3rd M1

Cost price + profit per pack

M1 dep

$$1.30$$

Do not accept 1.3

A1

Alternative method 3

$$100 \times 1.2(0) \text{ or } 100 \times 0.84$$

120 or 84 or 36

Profit

M1

$$40 \times 1.6(0) \text{ or } 60 \times 1.1(0)$$

64 or 66 or -2

Profit

M1

$$\text{their } 36 + \text{their } (-2)$$

34 if correct dep on

1st and 2nd M1

Profit after 40 packs sold

M1 dep

$$(0.4 \times \text{their } 150 - \text{their } 34) \div 20$$

dep on 3rd M1

Money needed $\div 20$

M1 dep

$$1.30$$

Do not accept 1.3

A1

[5]

M3. (Billie = £)8

$$\left(\frac{2}{3}\right)8$$

B1

their $8 \div 2 \times 3 (= 12)$
oe

M1

their $12 \div 4 \times 5$
oe

M1

15

A1

[4]

M4. $50(p) - \frac{30}{100} \times 50(p)$

or $\frac{70}{100} \times 50(p)$
oe

M1

35(p) or (£)(0).35

420(p) or (£)4.2(0)

140(p) or (£)1.4(0)

A1

$\frac{3}{4} \times 48(p)$ or $9 \times 48(p)$

or $3 \times 48(p)$

M1

36(p) or (£)(0).36

432(p) or (£)4.32

144(p) or (£)1.44

*Note: for **both** A marks to be awarded they must be buying the same number of tins*

A1

Correct conclusion from their working with all calculations shown

Strand (iii)

Must have both Ms awarded and be comparing like with like

Q1

[5]

M5. $\frac{6}{100} \times 23.5(0) (= 1.41)$
oe

M1

their $1.41 + 23.5(0) (= 24.91)$
oe $1.06 \times 23.5(0)$ M2

M1 dep

their $24.91 \times 4 (= 99.64)$
or
 $100 \div \text{their } 24.91 (= 4.(\dots))$
 $100 \div 4 (= 25)$

M1

Yes and 99.64
or
Yes and 4.(...)
Yes and 24.91 (<) 25

A1

Alternative method 1

$4 \times 23.5(0) (= 94)$

M1

$\frac{6}{100} \times \text{their } 94 (= 5.64)$ or $100 - \text{their } 94 (= 6)$
oe

M1

their $94 + \text{their } 5.64 (= 99.64)$
or

$\frac{\text{their } 6}{\text{their } 94} \times 100 (= 6.(\dots))$

oe 1.06×94 M3 dep on second M1

M1 dep

Yes and 99.64 or Yes and 6.(...)

A1

Alternative method 2

$$100 \div 4 (= 25)$$

M1

$$\text{their } 25 - 23.5(0) (= 1.5(0))$$

M1

$$\frac{\text{their } 1.5(0)}{23.5(0)} \times 100 (= 6.(...))$$

M1

Yes and 6.(...)

A1

[4]

M6. (50 – 43) red or 7 red or 14 (red) or 36 (blue and yellow)

$$R + 3Y + Y = 43 \text{ or } 2R + 3Y + Y = 50 \quad \text{oe}$$
$$\text{or } R = 7$$

M1

$$\text{their } 36 \div 4$$

$$4Y = 43 - 7 \quad \text{oe}$$

M1 dep

9

A1

[3]

M7. 7224

B1

$$\frac{2}{3} \times 11\,100 \text{ or } \frac{3}{4} \times 9600$$

oe

$$11\,100 \div 3 = 3700$$

$$11\,100 - \text{their } 3700$$

or

$$9600 \div 4 = 2400$$

$$9600 - \text{their } 2400$$

Allow 0.33 or better or [0.66, 0.67] for decimals

M1

7400

A1

7200

A1

Offer 3

Correct ft decision if M1 awarded

A1 ft

[5]

M8. 60 seen

B1

their 60 – $\frac{20}{100}$ × their 60 or 48

oe eg $\frac{80}{100}$ × 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]

M9. 240 ÷ 12 (= 20)

M1

$\left[\frac{15}{100} \times \text{their } 20 + \text{their } 20 \right]$ or 23

M1

8 × their 23

M1

184

A1

Correct conclusion from their working with all calculations shown

Strand (iii)

dep on all M marks and working seen

The students have saved enough

Q1

Alternative method 1

$$240 \div 12 (= 20)$$

M1

$$\text{their } 20 \times 8 (= 160)$$

M1

$$\frac{15}{100} \times \text{their } 160 + \text{their } 160$$

M1

$$184$$

A1

Correct conclusion from their working with all calculations shown

Strand (iii)

dep on all M marks and working seen

The students have saved enough

Q1

Alternative method 2

$$200 \div 8 (= 25)$$

Average amount saved per student

M1

$$240 \div 12 (= 20)$$

M1

$$\left[\frac{15}{100} \times \text{their } 20 + \text{their } 20 \right] \text{ or } 23$$

oe eg 1.15 \times \text{their } 20

M1

$$25 \text{ and } 23$$

A1

Correct conclusion from their working with all calculations shown

Strand (iii)

dep on all M marks and working seen

The students have saved enough

Q1

Alternative method 3

$$\left[\frac{15}{100} \times 240 + 240 \right] \text{ or } 276$$

oe eg 1.15×240

M1

their $276 \div 12 (= 23)$

M1

their 23×8

M1

184

A1

Correct conclusion from their working with all calculations shown

Strand (iii)

dep on all M marks and working seen

The students have saved enough

Q1

[5]

M10. 50×3 or 150

or $150 - 95$ or 55

M1

$$\frac{60}{100} \times 3 \text{ or } 1.8(0)$$

$$\text{oe eg } 3 - \left(\frac{40}{100} \times 3 \right)$$

M1

$(30 \times \text{their } 1.8(0))$ or 54

+ their $150 - 95$

M1

109

A1

their $150 + \text{their } 54 - 95$ with their
54 coming from 40%

or 60% correctly evaluated

and

a decision based on their answer

Strand (iii)

SC4 for (£)91 and No (from using

40% = £120)

Q1

*Those who cannot work out 40% or 60% correctly score a
maximum of M1 M0 M1 A0 Q0*

Alternative method

$$50 \times 3 \text{ or } 150$$

$$\text{or } 150 - 95 \text{ or } 55$$

M1

$$\frac{60}{100} \times 3 \text{ or } 1.8(0)$$

$$\text{oe eg } 3 - \left(\frac{40}{100} \times 3 \right)$$

M1

$$30 \times \text{their } 1.8(0) - \text{their } 45$$

Comparing 30 × their 1.8(0) with 45... the amount needed to make a profit of £100

M1

9

Comparing 54 and 45 from correct working

A1

their 150 + their 54 – 95 with their
54 coming from 40%
or 60% correctly evaluated

and

a decision based on their answer

Strand (iii)

Q1

[5]

M11. (a) $2000 \times 12 \div 50 \times 5$

oe

M1

$$2400$$

A1

(b) $(12 \times 2000) \times (0.)^{10}$
(= 2400 or 240 000)

Annual other running cost

M1

$$0.4 \times 24\,000 (= 9600)$$

Annual income

M1

4800

Profit after deductions

Their 9600 – their 2400 – their 2400

A1 ft

4800 > 3000, so YES

Strand (iii)

Valid conclusion with working clearly shown

Q1

[6]

M12. $6 \times 2 (\times 1) \times 1.25$

M1

15

A1

$15 \times 49.50 (+ 30)$ or
 $5 \times 67.50 (+ 430) (= 337.50)$

M1

(£) 742.50 or (£) 772.50

A1

Company B and (£) 767.50

A1

All stages of calculation shown with both M1s awarded

Strand (iii)

Condone numerical errors

Q1

[6]

M13. A = 4

B = 1

C = 6

D = 2

E = 5

B2 For 3 or 4 correct

B1 For 2 correct

SC B1 For C = 0, 1, 5 or 6

B3

[3]

M14. (a) 1000

B1

(b) $15\,000 \div 1200 (= 12.5 \text{ km/£})$
 $1200 \div 15\,000 (= 0.08 \text{ £/km})$
 $1200 \times 1.1 (= 1320)$

M1

$20\,000 \div \text{their } 12.5 (= 1600)$
Their $0.08 \times 20\,000 (= 1600)$
Their $1320 \div 15\,000 (= 0.088)$
 $0.08 \times 1.1 (= 0.088)$

M1 dep

Their $1600 \times 0.1 (= 160)$
or their 1600×1.1
Their $0.088 \times 20\,000$

M1 dep

1760

A1

Alt

$20\,000 \div 10\,000$ or 2

M1

2×800 or 1600

M1 dep

1600×1.1

M1 dep

1760

A1

[5]

M15. (a) $50 \leq \text{plan area} \leq 55$

B1 $43 \leq \text{plan area} < 50$ or
 $55 < \text{plan area} \leq 62$ or
Attempt to find plan area

B2

	<p>(b) (their) plan area $\times 4$ (= area of turf) <i>Allow restart with new (their) plan area</i></p>	<p>M1</p>
	<p>(their) area of turf \times cost / m^2 <i>Cost / $m^2 \leftrightarrow$ (their) area of turf</i></p>	<p>M1</p>
	<p>(£) 406 to (£) 446.60 inclusive <i>cao</i></p>	<p>A1</p>
		<p>[5]</p>
M16.	<p>(a) (i) 210</p>	<p>B1</p>
	<p>(ii) 170</p>	<p>B1</p>
	<p>(iii) $50 \times (\text{their } 210) \div (\text{their } 170)$</p>	<p>M1</p>
	<p>61.7(...) or 61.8 <i>or 62 with method</i> <i>ft From their T and $a + b + c$</i></p>	<p>A1ft</p>
	<p>(b) Fair</p>	
	<p><i>ft From their F</i></p>	<p>B1ft</p>
		<p>[5]</p>
M17.	<p>(a) $32 \times 36 \div 2$</p>	
	<p><i>oe</i></p>	<p>M1</p>
	<p>576</p>	<p>A1</p>
	<p>(b) 35.5</p>	<p>B1</p>
		<p>[3]</p>

M18. 25

30 or 5 or 50 seen B1

B2

[2]

M19. Any two correct calculations of 45 – 55 cookies

eg, $3 \times '18' = 54 = £14.97$ and $50 \times 0.75 = £37.50$

$$50 \times 0.75 = 37.5(0)$$

$$10 \times 2.25 = 22.5(0)$$

$$6 \times 2.99 = 17.94$$

$$4 \times 3.99 = 15.96$$

$$3 \times 4.99 = 14.97$$

B1

Evidence that 50 is broken down into 'blocks' of 18, 13, 8 etc ...

Not 50×1 or 10×5

M1

= 14.72

2 lots of 18 plus 13 plus 1

A1

[3]

M20. $35 \div 500 (\times 100)$ and

$28 \div 330 (\times 100)$

$$35 \div 500 \times 330 \text{ or } 28 \div 330 \times 500$$

$$500 \div 35 \text{ **and** } 330 \div 28$$

*500:35 **and** 330:28 **and** at least one attempt to cancel*

M1

0.07(7) and 0.08(48 ...)

$$23(.1) \text{ or } 42(.42)$$

$$14.(29) \text{ and } 11.(79) \text{ or } 12$$

Ratio with same multiple of 7

eg, 100:7 and 82.5:7 or 200:14 and 165:14

A1

Kelly or Fizzy orange

Must have working with one of two values correct

A1

[3]

M21. $100 \times 0.7 \div 5.5$
 Ratio weight biscuit: 100 = 0.7:5.5

M1

12.72... or 12.73

A1

12.7 or 13

Award for any value at least 4sf or calculation that is correctly rounded to 2 or 3sf

B1 ft

[3]

M22. £60

6000 6000 mins is B0

B1

150 – 30

150 \times 0.1 – 30 is M0

M1

Their 120 \times 0.1

1200

A1 ft

26 and Contract

2600 or cheaper by £34

A1

[4]

M23. Correct pair of comparable values (ignore units)

eg 1.5 and 1.6 (per 100g)

9 and 9.6 (per 600g)

(3) and 3.2 (per 200g)

4.5 and (4.8) (per 300g)

0.66... and 0.625 (g/p)

1.5 and 1.8 (difference) oe

B1 for finding one correct comparable value

or correct method to find one value

1.80 alone scores B0

B2

Regular

For correct comparison

ft allow their decision only if B1 given

B1 ft

[3]

M24. Sporty bar $3.4 \times \frac{100}{10.3}$
oe

M1

33.(.....)

A1

Fruity bar $17.4 \times \frac{62.6}{100}$
oe

M1

10.9

*Any correctly rounded accuracy 10.8924.
Accept 11 with working.*

A1

[4]

M25. Total reduction £6 + £1 (= £7)
25% of £4 = £1, 25% of 40% = 10%
75% of 40% = 30%

M1

Hence Jill plus justification
eg £7 is 70% of £10

$60\% + 10\% = 70\%$, 85% off £10 = £1.50

A1

[2]

M26. 10×50 or 500
or 50×7 or 350

M1

(their 500) $\times 7$ or 3500
or (their 350) $\times 10$

M1

(their 3500) $\div 1000$
or correct conversion (their g) \rightarrow kg

M1

3.5

oe

A1

[4]

M27.	(a) 80×1.75 <i>accept 80×1.45 and 80×105</i>	M1	[4]
	140	A1	
	(b) $\{190 - (\text{their } 140)\} \div (2.25 - 1.75)$ <i>Or (their 50) $\div 0$.</i> <i>Allow (their 50) in 30 minutes</i>	M1	
	100	A1 ft	
	ft from their (a)		

M28.	(a) (i) $30 \times 12 \times 4$	M1	[8]
	1440	A1	
	(ii) 4×30 <u>or</u> 4×12	M1	
	$2 \times (\text{their } 120) + 2 \times (\text{their } 48)$ only oe	M1 dep	
	336	A1	
	(b) 10×30 <i>or $279 \div 30$ (x5)</i>	M1	
	$(279 \div (\text{their } 300)) \times 100$ <i>or (their 9.3) $\div 10 \times 100$ or (their 46.5) $\div 50 \times 100$</i>	M1	
	93	A1	
	SC2 for 7		

M29. Attempt to scale to same number of balls
or works out ratios of balls and costs
or works out balls per £

eg $6.50 + \frac{6.50}{2}$
or 10×2 and $6.5(0) \times 3$
or $6 \div 4$ and $10 \div 6.50$
or $10 \div 6$ and $6.5(0) \div 4$
or $6 \div 10$ and $4 \div 6.5$
or $10 \div 3$ and $6.5(0) \div 2$

M1

Correct pair of values

eg 9.75
or 20 and 19.5(0)
or 1.5 and 1.53(...)
or 1.66(...) and 1.62(5)
or 0.6 and 0.61(...)
or 3.3(...) and 3.2(5)

A1

Pack of 4 (is better VFM)

Allow small/6.50 pack
For ft must have gained M1
Answer only is M0A0A0

A1 ft

[3]

M30. (a) $0.12 \times 385 (= 46.2)$
1.12 seen

Build up: 10% = $385 \div 10 (= 38.5)$

2% = $(38.5) \div 5 (= 7.7)$

and adds

M1

385 + their 46.2

1.12×385

M1 dep

431.2(0)

SC2 Answer 61.6

SC2 Answer 431 with no working

A1

(b) $164 \div 2 \frac{1}{2}$ or $164 \div 2.5$

M1

65.6

Answer of 65 or 66 with no working implies M1

A1

[5]

M31. $28\,000 - 5000 (= 23\,000)$

M1

$0.2 \times \text{their } 23\,000$
oe

M1 dep

4600

A1

[3]

M32. Number sold at 50p is $400 - 310 - 24 (= 66)$

M1

Receives $310 \times 80\text{p} = £248$

B1

'66' $\times 50\text{p} (= £33)$
M1 for any ($\leq 90 \times 50\text{p}$)

M1

Total = £281

(one correct)

A1 ft

[4]

M33. Time is $\frac{182}{35}$

M1

= 5.2 hours

5 hours 20 minutes

M1 A1

A1

= (5 hours +) 0.2×60 min

M1

= 5 hours 12 min

A1

[4]

