cookie

Practice paper: mark scheme

GCSE Maths Higher, practice paper 1 (non-calculator) (AQA style)

In the style of AQA GCSE Mathematics (8300) Paper 1 Higher

Practice paper written by cookie in the style of AQA GCSE Mathematics (8300) Paper 1 Higher. Not an AQA paper; not affiliated with or endorsed by AQA.

This mark scheme was written by cookie with its practice paper. Each row gives the answer, the marks and how they are given; where an answer is worded differently but means the same, give the mark.

Key

- M method marks, for a correct method
- A accuracy marks, which depend on the method mark before them
- B marks for a correct answer or step, independent of method
- P process marks, for a correct step in solving a problem
- C communication marks
- ft follow through from an earlier error; oe or equivalent; cao correct answer only

Do it online, timed and marked:
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Question	Answer and marking	Marks
01	**Answer: 2.5 (B)** B1 for 2.5	**1**
02	**Answer: $4x^6$ (A)** B1 for $4x^6$	**1**
03	**Answer: π (D)** B1 for π	**1**
04	**Answer: 120° (C)** B1 for 120°	**1**
05.1	**Answer: 5.04×10^{-4}** B1 for 5.04×10^{-4}	**1**
05.2	**Answer: 2.4×10^{-2}** M1 for 24×10^{-3} or 0.024 seen A1 for 2.4×10^{-2} cao *24×10^{-3} alone scores M1 A0 (not in standard form).*	**2**
06	**Answer: 1 1/2** M1 for both written as improper fractions: 11/4 and 11/6 M1 for multiplying by the reciprocal, e.g. 11/4 × 6/11, or a correct common denominator, e.g. 33/12 ÷ 22/12 A1 for 1 1/2 cao *3/2 or 6/4 scores M1 M1 A0 (must be a mixed number in its simplest form). Decimal methods (2.75 ÷ 1.8333…) score M0 unless fully correct to 1 1/2.*	**3**
07	**Answer: £280** M1 for a correct three-part ratio, e.g. 8 : 12 : 15 (oe) M1 for 15 − 8 = 7 parts or 56 ÷ 7 (= 8) M1 for (8 + 12 + 15) × their 8, or 64 + 96 + 120 A1 for £280 cao *Shares Ana £64, Ben £96, Cal £120. An incorrectly combined ratio (e.g. 2 : 3 : 5) scores M0 for the first mark; the next two method marks may be awarded ft their three-part ratio.*	**4**
08.1	**Answer: 2% increase** M1 for 1.2 × 0.85 (oe), or a correct calculation on an assumed price, e.g. 100 → 120 → 102 A1 for 2% increase *Do not accept 5% (20 − 15). An answer of 2% with no direction scores M1 A0.*	**2**
08.2	**Answer: £80** M1 for 64 ÷ 0.8 or 64 ÷ 80 × 100 (oe) A1 for £80 cao *Do not accept £76.80 (64 × 1.2) for any marks.*	**2**

09 — **3**

Answer: $2x^3 + 5x^2 - 28x - 15$

M1 for expanding any two brackets correctly, e.g. $x^2 + 2x - 15$ (allow one error in the four terms before simplifying)

M1 for multiplying their three-term quadratic by the third bracket, with at least 4 of their 6 terms correct

A1 for $2x^3 + 5x^2 - 28x - 15$ cao

10.1 — **2**

Answer: 9

M1 for $\sqrt[3]{27} = 3$ or $27^2 = 729$ seen

A1 for 9 cao

10.2 — **1**

Answer: 1/2

B1 for 1/2 (oe fraction)

Do not accept 0.5 (the question asks for a fraction) or −2.

10.3 — **2**

Answer: $x^{11}y^{-7}$ or x^{11}/y^7

M1 for $x^{15}y^{-6}$ seen, or one of x^{11} or y^{-7} in the final answer

A1 for $x^{11}y^{-7}$ or x^{11}/y^7

11.1 — **4**

Answer: 19 minutes

M1 for using midpoints 5, 15, 25, 35 (allow one error)

M1 for Σfx: 20 + 105 + 150 + 105 (= 380), ft their midpoints

M1 for their 380 ÷ 20

A1 for 19 cao

Using upper class bounds (10, 20, 30, 40) gives 24: M0 M1 M1 A0. Dividing by 4 (the number of groups) scores at most M1 M1 M0 A0.

11.2 — **1**

Answer: The exact times are not known; midpoints were used.

B1 for a correct reason, e.g. 'we don't know the actual times' or 'the midpoint of each group was used'

Do not accept 'because it is rounded' or 'the data is grouped' on its own without reference to not knowing the actual values.

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12 — **4**

Answer: x = 2, y = −1

M1 for multiplying to make the coefficients of x or y equal, e.g. 9x + 6y = 12 and 10x − 6y = 26 (allow one error), or a correct rearrangement and substitution

M1 for correctly adding or subtracting to eliminate a variable, e.g. 19x = 38 (ft their equations)

A1 for x = 2 or y = −1

A1 for x = 2 and y = −1 (cao)

Answers only with no working: x = 2, y = −1 scores 0 (the question says show your working); trial and improvement with no algebra scores 0.

13.1 — **2**

Answer: 12 cm

M1 for sin 30° = 6/AC, or AC = 6 ÷ sin 30°, or recognising AB is half the hypotenuse

A1 for 12 cao

13.2 — **2**

Answer: √3/2 × 1/√3 = 1/2

B1 for sin 60° = √3/2 and tan 30° = 1/√3 (or √3/3)

B1 for a fully correct conclusion: √3/(2√3) = 1/2

Values must be exact; decimal values score B0 B0.

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14 — **Answer: 8/15 (oe)** — **3**

M1 for 4/10 × 6/9 or 6/10 × 4/9 (= 24/90)
M1 for 4/10 × 6/9 + 6/10 × 4/9 (oe), or 1 − (4/10 × 3/9 + 6/10 × 5/9)
A1 for 8/15 (oe), e.g. 48/90
With replacement (4/10 × 6/10 × 2 = 12/25) scores M0 M1 A0.

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15 — **Answer: 100π cm^3** — **3**

M1 for $h^2 = 13^2 - 5^2$ or $h = \sqrt{144}$
M1 for $1/3 \times \pi \times 5^2 \times$ their 12
A1 for 100π cao
Using 13 as the height (1/3 × π × 25 × 13 = 325π/3) scores M0 M1 A0.

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16 — **Answer: y = 4/5 (or 0.8)** — **3**

M1 for $y = k/x^2$ (oe), or $5 = k/16$
M1 for k = 80
A1 for 4/5 or 0.8
y = k/x (inverse, not inverse square) gives k = 20 and y = 2: M0 M0 A0.

17.1 — **Answer: 62** — **2**

M1 for frequency = class width × frequency density for at least two classes, e.g. 10 × 1.2 = 12 or 5 × 3.6 = 18
A1 for 62 cao

17.2 — **Answer: 22** — **2**

M1 for 5 × 2.0 (= 10) or 15 × 0.8 (= 12)
A1 for 22 cao
20 + 12 = 32 (all of the 15 < h ≤ 25 class) scores M1 A0.

18.1 — **Answer: 3√3** — **2**

M1 for √75 = 5√3 or √12 = 2√3
A1 for 3√3 cao
Do not accept √63.

18.2 — **Answer: 3 + √3** — **3**

M1 for multiplying numerator and denominator by (3 + √3)
M1 for denominator 9 − 3 = 6, or numerator 18 + 6√3
A1 for 3 + √3 cao
(18 + 6√3)/6 not simplified scores M1 M1 A0.

19.1 — **Answer: $(x - 4)^2 - 13$** — **2**

M1 for $(x - 4)^2$ seen
A1 for $(x - 4)^2 - 13$
a = 4, b = 13 stated is acceptable.

19.2 — **Answer: (4, −13)** — **1**

B1ft for (4, −13), ft their $(x - a)^2 - b$ as (a, −b)

19.3 — **Answer: x = 4 ± √13** — **1**

B1ft for 4 ± √13, ft their a and b
Both values needed; 4 + √13 and 4 − √13 written separately is acceptable.

20.1 **Answer: 7** **1**
B1 for 7

20.2 **Answer: $f^{-1}(x) = (x + 3)/2$** **2**
M1 for $x = 2y - 3$ or $y + 3 = 2x$ (a correct first step in rearranging)
A1 for $(x + 3)/2$ (oe)
Accept $f^{-1}(x) = x/2 + 3/2$. Do not accept an answer in terms of y.

20.3 **Answer: x = 0 or x = 3** **3**
M1 for $gf(x) = (2x - 3)^2 + 1$
M1 for $(2x - 3)^2 = 9$, or $4x^2 - 12x - 1 = 9$ rearranged to $4x^2 - 12x = 0$ (oe)
A1 for x = 0 and x = 3
Using $fg(x) = 2(x^2 + 1) - 3 = 10$ scores M0. Only x = 3 found scores M1 M1 A0.

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21 **Answer: −3 < x < 4** **3**
M1 for $(x - 4)(x + 3)$ or critical values 4 and −3
A1 for both critical values −3 and 4
A1 for $-3 < x < 4$ (oe, e.g. $x > -3$ and $x < 4$)
$x < -3$ or $x > 4$ scores M1 A1 A0. Do not accept $-3 \leq x \leq 4$ for the final mark.

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22 **Answer: $(2n + 3)^2 - (2n + 1)^2 = 8n + 8 = 8(n + 1)$** **3**
M1 for two consecutive odd numbers in algebraic form, e.g. 2n + 1 and 2n + 3 (or 2n − 1 and 2n + 1)
M1 for a correct expansion of both squares, e.g. $4n^2 + 12n + 9 - (4n^2 + 4n + 1)$
A1 for $8n + 8 = 8(n + 1)$ with a conclusion that this is a multiple of 8
With 2n − 1 and 2n + 1 the difference is 8n: also full marks. Numerical examples only score 0. Using n and n + 2 scores M0.

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23 **Answer: 5x + 12y = 169** **4**
M1 for gradient of the radius OP = 12/5
M1 for gradient of the tangent = −5/12 (ft their gradient of OP)
M1 for $y - 12 = -5/12(x - 5)$ (oe), ft their tangent gradient
A1 for 5x + 12y = 169 (oe with integers)
Accept $-5x - 12y = -169$ or any integer multiple. $y = -5/12\ x + 169/12$ scores M1 M1 M1 A0 (not in the required form).

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24 **Answer: −1/6 a + 1/2 b** **3**
M1 for OM = 1/2 a + 1/2 b, or AM = 1/2(b − a)
M1 for PM = −2/3 a + OM, or PM = 1/3 a + AM (a correct vector route)
A1 for −1/6 a + 1/2 b (oe, e.g. 1/6(3b − a))

Total: 80 marks