INTUITION EDUCATION

HSC 2026 · PREDICTED PRACTICE PAPER

2026 HSC Mathematics Standard 2

Answers & marking notes

Paper total: 100 marks

Sit the paper first. These are worked answers with the marking notes behind them — what earns the mark, and the traps the marking centre has flagged in past years. Where a note names a band, it describes what a top-band response does, not a guaranteed mark.

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Answers & marking notes

Section I — correct responses

Q	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	B	D	A	C	C	A	D	B	D	B	C	D	C	C	A

Brief reasons:

1. Cost per 100 g: 52.0c, **48.0c**, 51.0c, 50.0c — the 750 g packet. **B**
2. $\binom{5}{2} = 10$ edges. **D**
3. $5a = 2b - c \Rightarrow b = \dfrac{5a + c}{2}$ (distractor B subtracts c instead of adding; C halves only part of the expression — the flagged order-of-operations errors). **A**
4. $180^\circ + 48^\circ = 228^\circ$ (distractors: $180^\circ - 48^\circ = 132^\circ$, $90^\circ + 48^\circ = 138^\circ$, $360^\circ - 48^\circ = 312^\circ$). **C**
5. Relative frequency $\frac{36}{120} = 0.3$; $0.3 \times 300 = 90$. **C**
6. $t = \dfrac{k}{v}$ is a rectangular hyperbola. **A**
7. Monthly rate $= \frac{6\%}{12} = 0.5\%$, $n = 48$: $8000(1.005)^{48}$. **D**
8. Strong negative linear association: $r \approx -0.85$ (-1 would require perfectly collinear points). **B**
9. $50\% + 34\% = 84\%$. **D**
10. Absolute error $= 0.05$ cm; $\frac{0.05}{6.4} \times 100 = 0.78\%$. **B**
11. z-scores: English 1.25, Maths 1.2, Music $\frac{68-60}{5} = 1.6$, Science 0.83. **C**
12. $\sin^{-1}(0.5) = 30^\circ$; obtuse solution $180^\circ - 30^\circ = 150^\circ$. **D**
13. A point well below the line at large x drags the line down (gradient decreases) and weakens the linear fit (r decreases). **C**
14. $\dfrac{40 \times 60}{8} = 300$. **C**
15. Only edges directed source → sink count: $6 + 5 = 11$ (the backward 4 is excluded). **A**

Question 16

Taxed items (GST-inclusive) $= 11 \times 4.50 = \$49.50$. GST-free items $= 87.45 - 49.50 = \$37.95$. (1 mark ×11 recognition; 1 mark answer. The ×10-vs-÷11 confusion scores 0 for $\$45.00$.)

Question 17

(a) Energy $= 0.9\ \text{kW} \times 5 \times 30 = 135$ kWh; cost $= 135 \times \$0.32 = \$43.20$. (1 mark W→kW and kWh; 1 mark cost in dollars.)

(b) $21.60 \div 0.32 = 67.5$ kWh; $67.5 \div 0.9 = 75$ hours.

Question 18

(a) First branch $\frac{5}{8}$ R, $\frac{3}{8}$ B; second branches $\frac{4}{7}/\frac{3}{7}$ after R and $\frac{5}{7}/\frac{2}{7}$ after B.

(b) $P(\text{same}) = \frac{5}{8}\cdot\frac{4}{7} + \frac{3}{8}\cdot\frac{2}{7} = \frac{20+6}{56} = \frac{26}{56} = \frac{13}{28}$. (1 mark both products; 1 mark sum. Unreduced $\frac{26}{56}$ accepted.)

Question 19

(a) Network on vertices A–E with the eight weighted edges from the table.

(b) MST edges: $DE(3), CD(4), AC(5), BC(6)$ — total 18 km. (1 mark correct tree — it is unique; 1 mark length.)

(c) With AC closed: $A \to D \to E = 9 + 3 = 12$ km (beats $A \to B \to E = 15$). The shortest path does not use the MST's A–C entry point — the designed trap.

Question 20

(a) $t = \dfrac{k}{n}$ with $k = 4 \times 18 = 72$, so $t = \dfrac{72}{n}$.

(b) $t = \frac{72}{6} = 12$ hours.

(c) $\frac{72}{n} \le 8 \Rightarrow n \ge 9$: **9 pumps**.

Question 21

Tax $= 5092 + 0.325 \times (87{,}500 - 45{,}000) = 5092 + 13{,}812.50 = \$18{,}904.50$. Medicare levy $= 0.02 \times 87{,}500 = \$1{,}750$. Total $= \$20{,}654.50$. (1 mark correct bracket in dollars not cents; 1 mark levy; 1 mark total.)

Question 22

(a) Axis of symmetry: $p = \dfrac{-200}{2(-5)} = \$20$.

(b) $R = -5(400) + 200(20) = \$2000$.

(c) $-5p^2 + 200p = 1500 \Rightarrow p^2 - 40p + 300 = 0 \Rightarrow (p-10)(p-30) = 0$: $p = \$10$ or $\$30$.

Question 23

Arrival in Sydney time: 9:50 am + 13 h 40 min = 11:30 pm Tuesday. Time difference $10 - (-7) = 17$ hours (LA behind). 11:30 pm Tuesday -17 h = **6:30 am Tuesday** in Los Angeles. (1 mark arrival in Sydney time; 1 mark 17-hour difference in the right direction; 1 mark time AND day.)

Question 24

Daily rate $= \frac{18.25\%}{365} = 0.05\%$. Interest $= 840\left(1.0005^{20} - 1\right) = 840 \times 0.0100476 = \$8.44$. (1 mark daily rate and $n = 20$; 1 mark interest only, not the future value $\$848.44$.)

Question 25

(a) Gradient $= \frac{76-40}{8-2} = 6$; $40 = 6(2) + c \Rightarrow c = 28$: $y = 6x + 28$.

(b) Each additional hour of revision is associated with an increase of 6 marks, on average. (Context, both variables, per-unit language required.)

(c) $y = 6(5) + 28 = 58$ marks.

(d) $x = 20$ gives $y = 148 > 100$, an impossible mark — 20 hours is far outside the data range, so extrapolation is unreliable.

Question 26

(a) $V = \pi r^2 h + \frac{1}{2} \cdot \frac{4}{3}\pi r^3$ with $r = 2$:
$V = \pi(4)(5) + \frac{2}{3}\pi(8) = 20\pi + \frac{16\pi}{3} = \frac{76\pi}{3} = 79.587\ldots \approx 79.6\ \text{m}^3$. (1 mark diameter → radius; 1 mark halved sphere formula; 1 mark combined and rounded.)

(b) $79.587\ \text{m}^3 \times 1000 = 79{,}587\ \text{L} \approx$ **79,600 L** (3 s.f.).

Question 27

(a) Quarterly rate $= \frac{3\%}{4} = 0.75\%$, $n = 16$ quarters → factor 16.932. Deposit $= \dfrac{20{,}000}{16.932} = \$1{,}181$.
(1 mark rate/period conversion and correct cell; 1 mark divide — not multiply — and round.)

(b) Interest $= 20{,}000 - 16 \times 1{,}181.20 = \$1{,}101$ (accept $\$1{,}101$–$\$1{,}104$ depending on rounding of the deposit).

Question 28

(a) From the ogive at cumulative frequencies 15, 30 and 45: $Q_1 = 22$, median $= 28$, $Q_3 = 34$ minutes.

(b) Box from 22 to 34 with median line at 28; whiskers to 12 and 48.

Question 29

$IQR = 34 - 22 = 12$; upper fence $= Q_3 + 1.5 \times IQR = 34 + 18 = 52$. Since $48 \leq 52$, 48 minutes is **not** an outlier. (1 mark fence; 1 mark comparison WITH a stated conclusion.)

Question 30

(a) $N = 4 \times 1.5 = 6$, $H = 3$, $M = 68$: $BAC = \dfrac{10(6) - 7.5(3)}{6.8 \times 68} = \dfrac{37.5}{462.4} = 0.0811\ldots \approx 0.081$. (1 mark $N = 6$; 1 mark substitution and rounding.)

(b) $\frac{0.081}{0.015} = 5.4$ h $= 5$ h 24 min (0.4 h $= 24$ min, not 40 min — the flagged trap).

(c) 11:30 pm $+5$ h 24 min $=$ **4:54 am**.

Question 31

(a) $48{,}000 - 4 \times 6{,}000 = \$24{,}000$.

(b) $48{,}000(1 - 0.15)^4 = 48{,}000 \times 0.85^4 = 48{,}000 \times 0.52200625 = \$25{,}056.30$. (1 mark $S = V_0(1 - r)^n$ with $r = 0.15$; 1 mark value.)

(c) Declining balance, by $25{,}056.30 - 24{,}000 = \$1{,}056.30$.

Question 32

16% above $660 \rightarrow 660$ is one standard deviation above the mean: $\mu + \sigma = 660$. 2.5% below $540 \rightarrow 540$ is two standard deviations below: $\mu - 2\sigma = 540$. Subtracting: $3\sigma = 120$, so $\sigma = 40$ hours and $\mu = 620$ hours. (1 mark each correct z-identification; 1 mark solving the pair.)

Question 33

(a) Scale $1 : 500 \rightarrow 1$ cm represents 5 m. Offsets: $1.6 \times 5 = 8$ m, $2.4 \times 5 = 12$ m, $2.0 \times 5 = 10$ m; spacing $2 \times 5 = 10$ m. (Scale conversion BEFORE the rule.)

(b) $A \approx \frac{10}{2}(8 + 12) + \frac{10}{2}(12 + 10) = 100 + 110 = 210$ m^2. (1 mark per application.)

(c) $V = 210 \times 0.15 = 31.5 \approx$ **32 m³** (2 s.f.).

Question 34

(a) $\cos 35^\circ = \dfrac{24}{AC} \Rightarrow AC = \dfrac{24}{\cos 35^\circ} = 29.2986\ldots \approx 29.3$ m.

(b) Sine rule in ACD: $\dfrac{AD}{\sin 40^\circ} = \dfrac{AC}{\sin 65^\circ} \Rightarrow AD = \dfrac{29.3 \sin 40^\circ}{\sin 65^\circ} = 20.78\ldots \approx 20.8$ m. (1 mark sine rule with sides opposite the correct angles; 1 mark answer. Full-accuracy AC gives the same rounded answer — no early-rounding penalty here, but working from 29.3 or 29.2986 both accepted.)

Question 35

(a) R: 0, 280, 560, 840, 1120; C: 400, 520, 640, 760, 880.

(b) Two straight lines; C has intercept 400, R passes through the origin.

(c) $400 + 12n = 28n \Rightarrow 16n = 400 \Rightarrow n = 25$ T-shirts (intersection of the graphs).

(d) Profit $= 1120 - 880 = \$240$.

Question 36

(a) $z = \dfrac{4.9 - 4.2}{0.5} = 1.4$.

(b) $P(Z < 1.4) = 0.9192$, so $P(\text{mass} > 4.9) = 1 - 0.9192 = 0.0808$. (1 mark table value; 1 mark complement.)

(c) $250 \times 0.0808 = 20.2 \approx$ **20 echidnas** (a whole-number count, not a probability).

Question 37

(a) Paths: A–C–$D = 3 + 4 + 6 = 13$; B–$D = 11$; A–C–$E = 9$. Minimum completion time **13 days**, critical path A–C–D. (1 mark time; 1 mark path.)

(b) D must start by day $13 - 6 = 7$, so $LST_B = 7 - 5 = 2$: float $= 2 - 0 = 2$ days.

(c) The increase of 3 days exceeds B's float of 2 days, so B becomes critical: new critical path B–D, new minimum time $8 + 6 = 14$ days.

Question 38

(a) $8 + 7 = 15$ L/min.

(b) The cut through XT and YT has capacity $5 + 9 = 14$; no flow can exceed the capacity of any cut, so maximum flow ≤ 14 (and 14 is achieved).

(c) Increase YT (the saturated edge in the minimum cut). Increasing it to 10 lifts the minimum cut, and the flow, to 15 (spare capacity exists on $S \to X \to Y$); increasing XT alone also lies on the min cut — accept XT or YT with a min-cut justification; reject $SX/SY/XY$ (not in the minimum cut).

Question 39

(a) Both bearings are measured clockwise from north at P: $\angle XPY = 122^\circ - 48^\circ = 74^\circ$.

(b) $XY^2 = 25^2 + 32^2 - 2(25)(32)\cos 74^\circ = 1649 - 1600(0.27564) = 1207.98$, so $XY = 34.8$ km. (1 mark cosine rule; 1 mark answer.)

(c) $\dfrac{\sin \angle PXY}{32} = \dfrac{\sin 74^\circ}{34.756} \Rightarrow \sin \angle PXY = 0.8850 \Rightarrow \angle PXY = 62^\circ$.

(d) Bearing of P from X is $48^\circ + 180^\circ = 228^\circ$; bearing of Y from X = $228^\circ - 62^\circ =$ **166°**. (The "of/from" reversal and the parallel-north-lines transfer are the marked skills.)

Question 40

(a) $2000 \times 4.452 = \$8{,}904$.

(b) 3000×8.111 would fund $\$3{,}000$ every year for all 10 years; the withdrawals in years 1–5 are only $\$2{,}000$, so the years 6–10 stream is valued as the 10-year factor minus the 5-year factor: $3000 \times (8.111 - 4.452) = 3000 \times 3.659 = \$10{,}977$. (1 mark explanation as a difference of two present values; 1 mark evaluation.)

(c) $8{,}904 + 10{,}977 = \$19{,}881$.

Prediction provenance

Which consensus prediction each part of this paper realises. Full evidence panels: intuitioneducation.com.au/hsc-2026

Paper item	Prediction	Agreement
Q22 quadratic revenue model, maximum via symmetry + equal-output prices	`std2-q1-quadratic-model`	0.70 · 5 (fable, gemini-3.1-pro, opus, deepseek, grok)
Q19 MST from a distance table + road-closure shortest path	`std2-q2-mst-network`	0.69 · 5 (gemini-3.1-pro, deepseek, grok, opus, gpt-5.6-sol)
Q39 two-leg bearings: cosine rule, sine rule, bearing of Y from X	`std2-q3-bearings-navigation`	0.69 · 4 (gemini-3.1-pro, deepseek, fable, gpt-5.6-sol)
Q37 critical path, float, duration-change justification	`std2-q4-critical-path`	0.69 · 4 (opus, deepseek, fable, grok)
Q17 appliance running cost + reverse hours	`std2-q5-running-cost`	0.67 · 4 (fable, opus, gpt-5.6-sol, deepseek)
Q27 FV annuity factor table, rate/period conversion, divide for deposit	`std2-q6-annuity-factor-table`	0.66 · 4 (fable, gemini-3.1-pro, opus, grok)
Q31 straight-line vs declining-balance comparison	`std2-q7-depreciation-comparison`	0.66 · 4 (gemini-3.1-pro, opus, fable, grok)
Q26 cylinder + hemisphere silo, volume and litres	`std2-q8-composite-solid`	0.65 · 4 (fable, opus, gpt-5.6-sol, grok)
Q25 regression: equation, slope in context, interpolation, extrapolation critique	`std2-q9-regression-interpretation`	0.64 · 6 (all)
Q30 BAC formula → time to zero → clock time	`std2-q10-bac-formula`	0.63 · 4 (gemini-3.1-pro, deepseek, fable, gpt-5.6-sol)
Q36 z-table → tail probability → expected count	`std2-q11-ztable-expected-count`	0.62 · 5 (fable, grok, gpt-5.6-sol, deepseek, opus)
Q18 two draws without replacement, P(same colour)	`std2-q12-without-replacement`	0.62 · 5 (gemini-3.1-pro, fable, opus, gpt-5.6-sol, deepseek)
Q21 income tax table + Medicare levy	`std2-q13-income-tax`	0.61 · 5 (gemini-3.1-pro, opus, deepseek, grok; fable dissents at 0.35 — see its no-tax-table bold call)
Q33 trapezoidal rule twice from a 1:500 plan → topsoil volume	`std2-q14-trapezoidal-scale`	0.57 · 5 (fable, deepseek, gpt-5.6-sol, opus, grok)
Q34 two triangles sharing side AC	`watch list`	~0.61 · 4
Q23 time zones with day + time demanded	`watch list`	~0.55 · 5
Q24 credit-card daily compounding, 20 chargeable days	`watch list`	~0.57 · 4

Paper item	Prediction	Agreement
MC Q11 z-score relative-performance comparison	watch list	~0.57 · 4
Q28 + Q29 box-plot from ogive + 1.5×IQR outlier test	watch list	~0.55 · 4
Q20 + MC Q6 inverse variation	watch list	~0.55 · 4
Q32 empirical-rule fractions (16%/2.5%) run in reverse	watch list	~0.55 · 3
Q40 two-phase annuity closer (difference of two PV factors)	watch list	~0.50 · 5 (the panel's widest-held watch item; placed as the paper's final question per deepseek's structural prediction)
Q35 break-even table–graph–profit	watch list	~0.52 · 4
Q38 + MC Q15 max-flow min-cut, backward edge excluded	watch list	~0.49 · 4
MC Q3 change the subject	watch list	0.80 (single model) · fable — the panel's highest single question probability
Q16 GST reverse on a receipt (×10 vs ÷11)	watch list	~0.45 · 3
MC Q1, Q2, Q4, Q5, Q8, Q9, Q10, Q12, Q13, Q14	topic-level consensus	— · —
Not realised: radial survey with a supplied triangle area (3 models, ~0.55)	watch list	— · bearings cluster realised at Q39 instead; practise the ½ab sin C rearrangement separately

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Built by an AI panel and backtested against the hidden 2025 papers before publication — method at intuitioneducation.com.au/hsc-2026/how-we-did-it. Scored publicly in November 2026. Independent Intuition Education material from publicly available NESA documents; not affiliated with or endorsed by NESA.