Assessment schedule: practice paper 2026

AS 91947 Demonstrate mathematical reasoning · Vertex Academy practice paper, not an NZQA paper

QUESTION ONE

Part	Evidence	Achievement (u)	Merit (r)	Excellence (t)
(a)	$(2x + 3)(x - 4) = 2x^2 - 8x + 3x - 12$ $= 2x^2 - 5x - 12$ $-2x(x - 5) = -2x^2 + 10x$ $2x^2 - 5x - 12 - 2x^2 + 10x$ $5x - 12$	Correct simplified expression $5x - 12$.		
(b)	$3a + 4c = 86$ $5a + 2c = 106$ $10a + 4c = 212$ $7a = 126$, so $a = 18$ $54 + 4c = 86$, so $c = 8$ Adult \$18, child \$8	Both equations formed and one variable eliminated, or one correct price.	Both prices correct, with an algebraic method shown.	
(c)	$25 + 0.4g < 40$ $0.4g < 15$ $g < 37.5$ 37 GB	Correct inequation formed, or $g < 37.5$.	37 GB, with the inequation solved and the whole number justified.	
(d)	long side $= 24 - 2x$ $A = x(24 - 2x)$ $A = 0$ at $x = 0$ and $x = 12$ $x = 6$ 6 m by 12 m, $A = 72$ m² $80 > 72$, so 80 m² is impossible	Area expression shown, or a correct area for one value of x.	6 m by 12 m and 72 m² found.	The maximum justified (symmetry of the parabola, or completing the square) AND 80 m² shown to be impossible with a reason.

QUESTION TWO

Part	Evidence	Achievement (u)	Merit (r)	Excellence (t)
(a)	$(x - 5)(x + 4) = 0$ $x - 5 = 0$ or $x + 4 = 0$ $x = 5$ or $x = -4$	Correct factorisation and both solutions.		

(b)	differences: +5 each time $7 = 5(1) + c$, so $c = 2$ $5n + 2 = 100$, so $n = 19.6$ Not a whole number, so no pattern uses exactly 100 tiles	Correct rule $T = 5n + 2$.	No, with $n = 19.6$ shown not to be a whole number (or 97 and 102 shown either side).	
(c)	gradient $= \frac{600 - 1800}{6 - 0} = -200$ −200 litres per hour: the tank loses 200 L each hour $V = 1800 - 200t$ $0 = 1800 - 200t$, so $t = 9$ Empty after 9 hours	Gradient of −200 found.	Gradient explained in context AND $V = 1800 - 200t$ with 9 hours.	
(d)	$y = a(x + 1)(x - 7)$ $14 = a(1)(-7)$, so $a = -2$ $y = -2(x + 1)(x - 7) = -2x^2 + 12x + 14$ $x = \frac{-1 + 7}{2} = 3$, $y = -2(4)(-4) = 32$ turning point (3, 32), a maximum since $a < 0$ $k = 32$; two points when $k < 32$	Equation of the parabola correct, or the turning point's x-value of 3.	Turning point (3, 32) with a correct equation.	$k = 32$ AND two points for $k < 32$, with reasoning from the turning point being a maximum.

QUESTION THREE

Part	Evidence	Achievement (u)	Merit (r)	Excellence (t)
(a)	$\tan\theta = \frac{0.6}{7.2}$ $\theta = \tan^{-1}(0.0833\ldots) = 4.763\ldots°$ 4.8°	Correct angle of 4.8° (accept 4.76°).		
(b)	$k = \frac{20}{15} = \frac{4}{3}$ volume factor $= k^3 = \frac{64}{27}$ $600 \times \frac{64}{27} = 1422.2\ldots$ 1422 mL	Scale factor 4/3 (or 1.33).	1422 mL found using the cube of the scale factor.	
(c)	base diagonal $= \sqrt{(40^2 + 30^2)} = 50$ cm rod $= \sqrt{(50^2 + 20^2)} = \sqrt{2900} = 53.85\ldots$ 53.9 cm $\tan\theta = \frac{20}{50} = 0.4$ $\theta = 21.8°$	Base diagonal of 50 cm, or the rod length of 53.9 cm.	Rod length AND the angle of 21.8° correct.	
(d)	cylinder $= \pi r^2 \times 3r = 3\pi r^3$ cone $= \frac{1}{3}\pi r^2 \times r = \frac{1}{3}\pi r^3$ $V = 3\pi r^3 + \frac{1}{3}\pi r^3 = \frac{10}{3}\pi r^3$ $\frac{10}{3}\pi r^3 = 90$, so $r^3 = \frac{27}{\pi}$ $r = 2.0484\ldots \rightarrow 2.05$ m height $= 4r = 8.193\ldots \rightarrow 8.19$ m	Volume of the cylinder or the cone correct in terms of r.	$V = 10/3\ \pi r^3$ shown.	r = 2.05 m AND height 8.19 m from the formula (accept 8.20 m from a rounded r).

Judgement for each question

N0	N1	N2	A3	A4	M5	M6	E7	E8
No response; no relevant evidence	One part attempted towards a solution	1u	2u	3u	1r	2r	1t with a minor error or omission	1t

Grade score out of 24 (each question's grade: N0 = 0 to E8 = 8): Not Achieved 0 to 6, Achieved 7 to 13, Merit 14 to 18, Excellence 19 to 24 (the 2025 exam's cut scores).