Assessment schedule: practice paper 2026

AS 91267 Apply probability methods in solving problems · Vertex Academy practice paper, not an NZQA paper

QUESTION ONE

Part	Evidence	Achievement (u)	Merit (r)	Excellence (t)
(a)	z = (125 − 105) ÷ 12 = 1.667 lower 125, upper 1E99 P(X > 125) = 0.0478	z = 1.667 AND probability 0.0478 correct.		
(b)	z = (90 − 105) ÷ 12 = −1.25 P(X < 90) = 0.1056 0.1056 × 2400 = 253.6, so about 254 fruit area to the left = 0.85, z = 1.036 x = 105 + 1.036 × 12 254 fruit; jumbo from 117.44 g	P(X < 90) = 0.1056 OR z = 1.036 found.	254 fruit (whole number) AND minimum jumbo weight 117.44 g, with working.	
(c)	P(X < 90) = 0.03 z = −1.881 −1.881 = (90 − μ) ÷ 12 μ = 90 + 1.881 × 12 μ = 112.57 g	Correct negative z-value (−1.881) found.	μ = 112.57 g found with valid working using the negative z-value.	
(d)	A: mean 105.2 ≈ median 105, so symmetric B: mean 102.6 > median 98, long right tail, so right-skewed median B 98 g < median A 105 g IQR B 18 g > IQR A 16 g; SD 15.8 g > 12.1 g model: P(X < 80) = 0.0763, 0.0763 × 300 ≈ 23 fruit Sample has 0 fruit under 80 g, so the normal model does not fit B	General statements about both orchards for ONE of shape, centre or spread.	Comparisons of both orchards for TWO of shape, centre and spread, with correct numbers in at least one.	Comparisons with numbers and correct terms for all THREE of shape, centre and spread, including that B's fruit tend to be lighter and a spread comment using IQR or standard deviation, AND the normal model rejected with a correct calculation.
(e)	z = −1.282 (area 0.10) and z = 1.645 (area 0.95) 90 = μ − 1.282σ, 130 = μ + 1.645σ 2.926σ = 40, so σ = 13.67 g μ = 90 + 1.282 × 13.67 = 107.52 g P(100 < X < 120) = 0.5283, × 20 000 = 10 565 sample $\frac{34}{400}$ = 0.085 against model 0.10 (40 fruit) μ = 107.52 g, σ = 13.67 g; about 10 565 fruit; the sample fits the model	Both z-values (−1.282 and 1.645) found, OR one correct equation formed.	Correct mean AND standard deviation found.	Correct mean and standard deviation AND the expected number (about 10 565) AND the sample compared with the model with a valid comment.

QUESTION TWO

Part	Evidence	Achievement (u)	Merit (r)	Excellence (t)
(a)	suitable 0.7, not 0.3 0.7 × 0.9 = 0.63 0.3 × 0.3 = 0.09 P(goes ahead) = 0.72	Correct probability (0.72), with a tree or equivalent working.		
(b)	P(goes ahead) = 0.63 + 0.09 = 0.72 P(suitable = 0.875 0.72 × 40 = 28.8 0.875; about 29 lessons	P(goes ahead) = 0.72 OR 0.63 found.	Conditional probability 0.875 AND expected number (28.8, or about 29) correct.	
(c)	0.10 + 0.25 + k + 0.20 + 0.15 = 1, so k = 0.3 260 ÷ 65 = 4, so at least 4 students P(X ≥ 4) = 0.3 + 0.20 + 0.15 = 0.65 0.65 × 200 = 130 P(X ≥ 5) = 0.20 + 0.15 = 0.35 k = 0.3, 130 lessons, 0.35	k = 0.3 OR P(X ≥ 5) = 0.35.	P(X ≥ 4) = 0.65 (using k = 0.3) AND 130 lessons.	
(d)	0.4p + 0.6 × 0.85 = 0.67 0.4p = 0.16, so p = 0.4 P(beginner P(beginner and not) = 0.4 × 0.6 = 0.24 0.24 × 25 = 6 p = 0.4; 0.2388; 6 beginners	Correct tree with 0.6 × 0.85 = 0.51 found, OR a correct equation in p.	p = 0.4 found with valid working.	p = 0.4 AND P(beginner | stands up) = 0.2388 AND 6 beginners expected.
(e)	P(exactly 4) ≈ $\frac{2}{50}$ = 0.04 P(more than 10) ≈ $\frac{14}{50}$ = 0.28 mean ≈ 427 ÷ 50 = 8.54 $1 \times \frac{3}{4} \times \frac{2}{4} \times \frac{1}{4} = \frac{3}{32}$ = 0.0938 0.04 against 0.0938: few trials, so chance variation; more trials would get closer	One experimental probability correct.	All three estimates correct (0.04, 0.28, 8.54) OR the theoretical probability 0.0938 found.	Theoretical probability 0.0938 found AND compared with the experimental 0.04, with the small number of trials given as the reason for the difference.

QUESTION THREE

Part	Evidence	Achievement (u)	Merit (r)	Excellence (t)
(a)	45 ÷ 800 = 0.05625 = 5.625% 27 ÷ 45 5.625%; 0.6	Both answers correct.		

(b)	risk wearers = 18 ÷ 600 = 0.030 risk non-wearers = 27 ÷ 200 = 0.135 RR = 0.030 ÷ 0.135 = 0.222 1 − 0.222 = 0.778, so 77.8% less likely RR = 0.222: wearers are 0.222 times as likely to be injured	Both risks correct (0.03 and 0.135).	Relative risk 0.222 (or 4.5) AND correctly interpreted in context.	
(c)	444, 16, 320, 748 back or concussed = 320 + 36 = 356 356 ÷ 800 = 0.445 444 ÷ 748 = 0.5936 0.445; 0.594	Table correctly completed.	Table completed AND both probabilities correct (0.445 and 0.594).	
(d)	36 ÷ 16 = 2.25 compares counts, but 480 ≠ 320 risk F = 36 ÷ 480 = 0.075, risk B = 16 ÷ 320 = 0.050 RR = 0.075 ÷ 0.050 = 1.5 1.5 < 2, so the claim is wrong 0.075 × 320 = 24 RR = 1.5, claim rejected; 24 backs	Both risks correct (0.075 and 0.05), OR the error explained.	Relative risk 1.5 calculated AND interpreted in context.	Error explained (different group sizes) AND relative risk 1.5 correctly interpreted AND the claim evaluated as wrong, AND 24 backs found.
(e)	0.7 × P(I P(I P(I) = 0.3 × 0.024 + 0.042 = 0.0072 + 0.042 = 0.0492 P(custom 0.0492 × 1500 = 73.8 0.0492; 0.146; about 74 injuries	Risk for shop-bought players (0.06) found.	Risk for custom players (0.024) AND P(injury) = 0.0492 found.	P(injury) = 0.0492 AND P(custom | injured) = 0.146 AND about 74 injuries expected, with clear working.

Judgement for each question

N0	N1	N2	A3	A4	M5	M6	E7	E8
No response; no relevant evidence.	A valid attempt at one question.	1u	2u	3u	1r	2r	1t	2t

Grade score out of 24 (each question's grade: N0 = 0 to E8 = 8): Not Achieved 0 to 7, Achieved 8 to 13, Merit 14 to 19, Excellence 20 to 24 (the 2025 exam's cut scores).