Daily Question Applied Maths Day 2 Solutions

Qu	Scheme	Marks	AO
(a)	[P($H > 1.6$) =] 0.091211… = awrt **0.0912**	B1 (1)	1.1b
(b)	Need H and T to be independent or events $\{H > 1.6\}$ and $\{T < 300\}$ are independent	B1 (1)	2.4
(c)	[P($T < 300$) =] 0.124(2816…) Prob both is: "0.0912..."×"0.124..." = 0.011335… = awrt **0.0113**	M1 M1 A1 (3)	3.4 1.1b 1.1b
(d)	$\frac{16.3-\mu}{\sigma} = -0.5244(0051...)$, $\frac{29-\mu}{\sigma} = 1.2816$ (calc: 1.28155156…) e.g. $29-16.3 = \sigma$("1.2816"−"−0.5244") $\sigma = 7.032115...$ = awrt **7.03** $\mu = 19.9876...$ = **19.95** „ μ „ **20.0**	M1M1 M1 A1 A1 (5)	3.1a 1.1b 1.1b 1.1b 3.2a
		(10 marks)	

	Notes
(a)	B1 for awrt 0.0912 (from calculator)
(b)	B1 for a suitable reason mentioning or implying H and T are independent Allow: e.g. "they"/ "each event"/ "P(H) and P(T)"/ "the variables" **and** "independent" B0 for "the results" /"the values" are independent. Ignore other comments that are not incorrect or contradictory.
(c)	1st M1 for using model for T to attempt to find P($T < 300$) e.g. sight of 0.124 or better or sight of $\pm\left(\frac{300-330}{26}\right)$ or $\pm\left(\frac{5-5.5}{0.433...}\right)$ or $Z = \pm 1.15(3...)$ 2nd M1 for multiplying their two probabilities together ft part (a) and their P($T < 300$) provided both values are probabilities. NB M0M1 is possible here A1 for awrt 0.0113 [Correct answer with no incorrect working 3/3]
(d)	1st M1 for standardising 16.3 and setting equal to z value where $0.5 < \|z\| < 0.6$ 2nd M1 for standardising 29 and setting equal to z value where $1 < \|z\| < 1.5$ 3rd M1 dep on 1st or 2nd M1 for solving their two linear eq'ns – reach an eq'n in one variable May be implied by sight of $\sigma = 7$ (or better) or $\mu = 20$ (or better) **For 1st A mark we must also see one of – 0.5244 or 1.2816 (or better) used in their equ'ns OR both z values correct to 3dp i.e. – 0.524 and 1.282** 1st A1 for σ = awrt 7.03 (but see 3rd case below) 2nd A1 for μ = in [19.95, 20.0] (i.e shouldn't see something rounding down to 20.0) Allow 20 from equations with suitable z values (see examples below)
NB	Use of – 0.524 and 1.28 [would give 7.0399… and 19.988…] and scores M3A0A1 Use of – 0.524 and 1.2816 [would give 7.033… and 19.99…] and scores M3A1A1 Use of – 0.5244 and 1.28 [would give 7.038… and 19.99 …] and scores M3A1A1 Both z values correct to 3dp i.e. – 0.524 and 1.282 [should give 7.032 and 19.984] scores A1A1