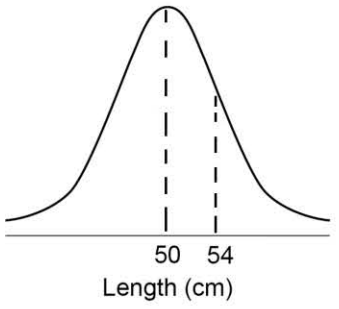
Q	Marking instructions	AO	Marks	Typical solution
17(a)	Labels 50 on the horizontal axis below the vertex Condone label at the vertex	3.3	B1	
	Labels 54 on the horizontal axis below the right-hand point of inflection Condone label at the right-hand point of inflection	3.3	B1	
	Subtotal		**2**	

Q	Marking instructions	AO	Marks	Typical solution
17(b)	States 0.5	1.2	B1	0.5
	Subtotal		**1**	

Q	Marking instructions	AO	Marks	Typical solution
17(c)	Obtains **AWFW** [0.0668, 0.067]	1.1b	B1	0.0668
	Subtotal		**1**	

Q	Marking instructions	AO	Marks	Typical solution
17(d)	Obtains **AWFW** [0.987, 0.99]	1.1b	B1	0.9876
	Subtotal		**1**	

Q	Marking instructions	AO	Marks	Typical solution
17(e)	Forms $\frac{x-50}{4} = -1.6449$ or forms $50 + 4\times(-1.6449)$ **PI** by correct answer or **AWFW** [56.56, 56.6]cm or 57cm Allow [–4, 4] except ±0.95 or ±0.05 or 0 for –1.6449	3.1b	M1	$\frac{x-50}{4} = -1.6449$ Minimum length is 43.4 cm
	Obtains **AWFW** [43.4, 43.44] cm or 43 cm Condone missing units	1.1b	A1	
	Subtotal		**2**	

Q	Marking instructions	AO	Marks	Typical solution
17(f)	States $H_0: \mu = 50$ $H_1: \mu > 50$	2.5	B1	X = length of new-born baby $H_0: \mu = 50$ $H_1: \mu > 50$ $\overline{x} = 51.5$ $\bar{X} \sim N(50, \frac{4^2}{40})$ $P(\bar{X} > 51.5) = 0.0089$ $0.0089 < 0.1$ Reject H_0 There is sufficient evidence to suggest that the mean length of a new-born baby at the clinic in 2020 has increased compared to 2019.
	Obtains 51.5 **OE**	1.1b	B1	
	States or uses correct model **PI** by normal with mean 50 **and** variance $\frac{4^2}{40}$ or 0.4 or standard deviation $\sqrt{0.4}$ or 0.63 or better **OE** or by correct probability **AWFW** [0.0086, 0.009] or test statistic $(\pm)\frac{51.5-50}{\frac{4}{\sqrt{40}}}$ FT their 51.5 for test statistic or test statistic value **AWFW** $(\pm)$[2.37, 2.4] or critical value **AWFW** [50.8, 51]	1.1a	M1	
	Obtains **AWFW** [0.0086, 0.009] or the correct value of the test statistic **AWFW** [2.37, 2.4] or acceptance region $\leq$ **AWFW** [50.8, 51] allow strict inequality or critical region $\geq$ **AWFW** [50.8, 51] allow strict inequality or critical value **AWFW** [50.8, 51]	1.1b	A1	

	Correctly compares their value of $P(>$ or $\geq$ their sample mean) with 0.1 or correctly compares their positive test statistic with **AWFW** [1.28, 1.282] or correctly compares 51.5 with their acceptance region or critical region or critical value **FT** their sample mean May be seen on a diagram	3.5a	M1	
	Infers H_0 rejected **FT** their comparison Condone accept H_1	2.2b	A1F	
	Concludes, from a fully correct comparison, in context by referring to an **increase** in the **mean** length of new-born baby at the clinic. Conclusion must not be definite, eg use of 'suggest', 'support' etc To be awarded R1, marks B0B1M1A1M1A1 must be scored as the minimum	3.2a	R1	
	Subtotal		**7**	

	Question 17 Total		**14**	