Question Number	Scheme	Marks
2(a)	$\overline{x} = \frac{4530}{60} = 75.5$	B1
	$s^2 = \frac{350\,761 - 60 \times "75.5"^2}{59}$	M1
	$= \frac{8746}{59} = 148.237...$ **awrt 148**	A1
		(3)
(b)	$H_0 : \mu_B - \mu_A = 2, \quad H_1 : \mu_B - \mu_A > 2$	B1
	$\pm \frac{82.3 - "75.5" - 2}{\sqrt{\frac{17.4^2}{80} + \frac{"148"}{60}}} = 1.919...$ **awrt 1.92**	M1 dM1 A1
	Critical value $z = 1.6449$ (p value awrt 0.0274 <0.05)	B1
	Reject H_0 / Significant result	ddM1
	Sufficient evidence to suggest that the mean length of salmon in region *B* is more than 2 cm greater than the **mean length** of salmon in **region** *A* / Sufficient evidence to support the **biologist** claim.	A1ft
		(7)
(c)	Assumed that the sample variance (s^2) is equal to the population variance (σ^2) for both regions	B1
		(1)

	Notes	Total 11
(a)	**B1**	75.5 cao
	M1	A correct expression for either s or s^2 (ft their mean)
	A1	$\frac{8746}{59}$ or awrt 148
(b)	**B1**	Both hypotheses stated correctly, must be in terms of μ. Allow equivalent hypotheses. Condone the use of X and Y for A and B
	M1	Attempt at the SE using their part (a). e.g. $\sqrt{\frac{17.4^2}{80} + \frac{"148"}{60}}$. May be in their standardisation. (Implied by awrt ± 1.92 seen or awrt 0.0274)
	dM1	**Dependent on 1st M1** for standardising correctly. Allow $\pm$. Must be in the form $\frac{82.3 - "75.5" - 2}{\sqrt{\frac{p}{q} + \frac{r}{s}}}$ or equivalent. (Implied by awrt ± 1.92 seen or awrt 0.0274)
	A1	awrt 1.92 or awrt -1.92 or awrt 0.0274
	B1	Critical value of ± 1.6449 or better (seen). Allow for a p value of awrt 0.0274 <0.05 using tables)
	ddM1	**Dependent on both previous M marks**. A correct non-contextual statement based on their normal CV and their test statistic. – Do not allow contradicting non contextual comments.
	A1ft	Correct comment in context rejecting the null hypothesis. Must mention **mean, length, region** Allow sufficient evidence to support the **biologists** claim (o.e)

(c)	**B1**	Suitable comment assuming $s^2 = \sigma^2$ for both regions (o.e) (Allow $s_x{}^2 = \sigma_x{}^2$ and $s_y{}^2 = \sigma_y{}^2$ (o.e))