Question	Scheme	Marks	AOs
1(a)	$[\bar{x} =] \frac{798}{30} = 26.6$	B1 cao	1.1b
	$[\sigma_x =] \sqrt{\frac{21357.5}{30} - \bar{x}^2} = \sqrt{4.35666\ldots} = \text{awrt} 2.09$ Allow $[s =] \sqrt{\frac{21357.5 - 30\bar{x}^2}{29}} = \text{awrt} 2.12$	B1	1.1b
		(2)	
(b)	$[\bar{x} - 3\sigma =] 14.8 - 3 \times 2.37 = 7.69$ or $[\bar{x} + 3\sigma =] 14.8 + 3 \times 2.37 = 21.91$	M1	2.1
	$8.8 > 7.69$ and $18.5 < 21.91$ so no outliers	A1	1.1b
		(2)	
(c)(i)	Mean for Perth is lower than mean for Jacksonville which suggests the daily mean air temperature is higher in the northern hemisphere (in June).	B1	2.2b
	Standard deviations are similar which suggests similar levels of variation of the daily mean air temperature in each hemisphere (in June). OR Sizes of standard deviations are small compared with the difference in mean temperatures making it more likely that the difference in means is significant.	B1	2.2b
		(2)	
(ii)	This is based on one location in each hemisphere and therefore is not valid as temperatures are likely to vary across each hemisphere.	B1 (1)	2.4
(d)	$P(X > 29) = 0.17045\ldots$	M1	3.4
	5.11 days (accept awrt 5)	A1	1.1b
		(2)	
			(9 marks)

Question 1 continued

Notes:

(a)
B1: for mean
B1: awrt 2.09 (allow $s = 2.12$)

(b)
M1: for a correct method to find the lower or upper limit for outliers
A1: for comparing minimum and maximum values to outlier limits and concluding

(c) (i)
B1: for a suitable comparison of means and comment in context
B1: for a suitable comparison of standard deviations and comment in context
Do not accept e.g "Standard deviation for Perth is higher than standard deviation for Jacksonville which suggests daily mean air temperature is more consistent in the northern hemisphere (in June)" because students should be familiar with the idea that small differences in these statistics are not always meaningful and should be aware of the likely size of differences having explored the large data set.
(ii)
B1: a suitable explanation why assumption is not valid.

(d)
M1: for use of the model to attempt a correct probability
A1: for a correct prediction