

Q	Marking instructions	AO	Marks	Typical solution
18(a)	Calculates $1.78 \pm 2 \times 0.23$ or $1.78 \pm 1.96 \times 0.23$ or calculates $P(1.33 < x < 2.22)$ PI by 0.9469 or 0.947 or calculates $\frac{1.33 - 1.78}{0.23}$ and $\frac{2.22 - 1.78}{0.23}$	3.1b	M1	$1.78 - 2 \times 0.23 = 1.32$ $1.78 + 2 \times 0.23 = 2.24$  $1.32 \approx 1.33$ $2.24 \approx 2.22$  Height is continuous data and 95% of heights lies within two standard deviations of the mean so normal may be a suitable model.
	Obtains 1.32 and 2.24 and states they are approximately 1.33 and 2.22 or obtains 1.33 and 2.23 and states they are approximately 1.33 and 2.22 or obtains 0.9469 or 0.947 and states is approximately 0.95 or obtains -1.96 and 1.91 and states are approximately -2 and 2	2.4	A1	
	Infers that the normal distribution may be suitable because <b>height</b> is <b>continuous</b> data and <b>95%</b> of heights lies within two standard deviations of the mean or Infers that the normal distribution may be suitable because <b>height</b> is <b>continuous</b> data and <b>94.69%</b> or <b>94.7%</b> of heights lies between 1.33 and 2.22	2.2b	R1	
	<b>Subtotal</b>		<b>3</b>	

Q	Marking instructions	AO	Marks	Typical solution
18(b)(i)	States 0	1.2	B1	0
	Subtotal		1	

Q	Marking instructions	AO	Marks	Typical solution
18(b)(ii)	Calculates the correct probability AWFW [0.335, 0.34]	1.1b	B1	0.335
	Subtotal		1	

Q	Marking instructions	AO	Marks	Typical solution
18(b)(iii)	Finds the value of their answer to (b)(ii) squared Their answer must be correct to at least 2sf	3.1b	B1F	$0.335^2 = 0.112$
	Subtotal		1	

Q	Marking instructions	AO	Marks	Typical solution
18(c)	Obtains 1.73 CAO Ignore missing or incorrect units	1.1b	B1	<div>Mean = 1.73</div> <div>Standard deviation = <math>\sqrt{\frac{2.81}{40}}</math></div> <div>= 0.265</div>
	Uses the correct formula for standard deviation eg $s = \sqrt{\frac{2.81}{39}}$ Do not allow variance = $\sqrt{\frac{2.81}{40}}$	1.1a	M1	
	Obtains the correct standard deviation AWFW [0.265, 0.27] Allow if not labelled but if labelled, must be correct Ignore missing or incorrect units	1.1b	A1	
	Subtotal		3	

Q	Marking instructions	AO	Marks	Typical solution
18(d)	<p>Uses their mean and 1.78 to compare heights Comparison must include on average. Follow through their answer to part (c) Do not allow 'general' Allow statement that they're about the same on average</p>	2.2b	E1F	<p>Summer athletes are taller on average than Winter athletes.</p> <p>Summer athletes' heights are less varied than the heights of Winter athletes.</p>
	<p>Uses their standard deviation and 0.23 to compare heights Comparison must include 'varies', 'spread' 'disperse' 'more variation' or 'consistent' Follow through their answer to part (c) Allow statement that they are about the same Do not allow comparison that includes 'range' or 'variety'</p>	2.2b	E1F	
	<b>Subtotal</b>		<b>2</b>	

	<b>Question 18 Total</b>		<b>11</b>	
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