Question	Answer	Marks
1(a)	$\frac{\Sigma x}{7} = \frac{34.7}{7} = 4.9571$ or 4.96 (3 sf) ($\Sigma x^2 = 175.15$)	**B1**
	$\frac{7}{6}\left(\frac{"175.15"}{7} - "4.9571"^2\right)$	**M1**
	0.523 (3 sf)	**A1**
		3
1(b)	$'4.96' \pm z \times \sqrt{\frac{0.523}{7}}$ (**FT** *their* mean and standard deviation)	**M1**
	$z = 1.96$	**B1**
	4.42 to 5.49 (3 sf)	**A1**
		3

Question	Answer	Marks
2(a)	Assume standard deviation unchanged or standard deviation = 0.08	**B1**
	Assume yields normally distributed	**B1**
		2
2(b)	H_0: Population mean yield (or μ) = 0.56 H_1: Population mean yield (or μ) > 0.56	**B1**
	$\frac{0.61-0.56}{\frac{0.08}{\sqrt{10}}}$	**M1**
	1.976	**A1**
	Comp 1.96	**M1**
	There is evidence that mean yield has increased	**A1**
		5

Question	Answer	Marks
3(a)	N(240, 6×1.5^2) or N(240, 13.5)	**M1**
	$\frac{245 - "240"}{\sqrt{"13.5"}}$ (= 1.361)	**M1**
	1 – Φ(“1.361”)	**M1**
	0.0867 (3 sf)	**A1**
		4
3(b)	Use of $L - 4S$ or similar	**M1**
	E($L - 4S$) = –8	**B1**
	Var($L - 4S$) = $1.5^2 + 16 \times 0.7^2$ or 10.09	**B1**
	$\frac{0 - ("-8")}{\sqrt{"10.09"}} (= 2.519)$	**M1**
	Φ(“2.519”)	**M1**
	0.994 (3 sf)	**A1**
		6

Question	Answer	Marks
4(a)	$(1^2 + 2^2 + 3^2 + 4^2 + 5^2) \div 5 - 3^2$ (= 2 **AG**)	**B1**
		1
4(b)	N(3, 2)	**M1**
	$\frac{2.6 - "3"}{\sqrt{\frac{2}{40}}} (= -1.789)$	**M1**
	$\Phi("-1.789") = 1 - \Phi("1.789")$	**M1**
	0.0367 to 0.0368	**A1**
		4
4(c)	Concluding that spinner is unbiased when it is biased	**B1**
		1

Question	Answer	Marks
5(a)(i)	$e^{-2.9} \times \frac{2.9^4}{4!}$	**M1**
	0.162 (3 sf)	**A1**
		2
5(a)(ii)	$e^{-2.1} \times \frac{2.1^4}{4!} \times e^{-0.8} + e^{-2.1} \times \frac{2.1^3}{3!} \times e^{-0.8} \times 0.8$	**B1**
	(**B1** for either expression correct, **M1** for P(4, 0) + P(3, 1))	**M1**
	0.113 (3 sf)	**A1**
		3
5(b)	N(29, 29)	**M1**
	$\frac{24.5 - 29}{\sqrt{29}} (= -0.83563)$	**M1**
	1 – Φ(“0.836”)	**M1**
	0.202 (3sf)	**A1**
		4
5(c)	29 is large or 29 > 15	**B1**
		1

Question	Answer	Marks
6(a)	'Tails down' parabola only from $x = 0$ to 20 shown	**B1**
		1
6(b)	Symmetrical	**B1**
		1
6(c)	$\frac{3}{4000}\int_0^{20}\left(20t^3 - t^4\right)\mathrm{d}x = \frac{3}{4000}\left[20\frac{t^4}{4} - \frac{t^5}{5}\right]_0^{20}$	**M1**
	$\mathrm{Var}(T) = \frac{3}{4000}\times 160000 - 10^2$	**M1**
	20	**A1**
		3
6(d)	$(p - 0.5)\times 2$ or $1 - 2(1-p)$	**M1**
	$2p - 1$	**A1**
		2

Question	Answer	Marks
6(e)	$\frac{3}{4000}\int_{8}^{12}\left(20t-t^2\right)\mathrm{d}x$	**M1**
	$\frac{3}{4000}\left[20\frac{t^2}{2}-\frac{t^3}{3}\right]_{8}^{12} = \frac{3}{4000}\left(1440-576-640+\frac{512}{3}\right)$	**A1**
	$\frac{37}{125}$ or 0.296	**A1**
		3
6(f)	Does not allow times greater than 20 minutes	**B1**
		1