

1(a)	$e^{-3} \left(\frac{3^3}{3!} + \frac{3^4}{4!} \right) = e^{-3}(4.5 + 3.375) = 0.22404 + 0.16803$
	$= 0.392 \text{ (3 sf)}$
1(b)	$\lambda = 5$
	$1 - e^{-5} \left(1 + 5 + \frac{5^2}{2!} \right) = 1 - e^{-5}(1+5+12.5)$
	$= 1 - (0.0067379 + 0.0336897 + 0.0842243)$
	$= 0.875 \text{ (3 sf)}$
1(c)	$T \sim N(600, 600)$
	$\frac{559.5-600}{\sqrt{600}} [= -1.653]$
	$\Phi(-1.653) = 1 - \Phi(1.653)$
	$= 0.0492 \text{ (3 sf) or } 0.0491$

2	$\text{est } (\mu) = 499.5 \text{ or } 29970/60$
	$\text{est } (\sigma^2) = \frac{60}{59} \left(\frac{14970300}{60} - '499.5'^2 \right) \text{ or } 1/59(14970300 - (29970)^2/60)$
	$= 4.83 \text{ or } 285/59$
	$H_0: \text{Pop mean (or } \mu) = 500$ $H_1: \text{Pop mean (or } \mu) \neq 500$
	$\frac{'499.5' - 500}{\frac{\sqrt{'4.83'}}{\sqrt{60}}}$
	$= -1.762$
	$'1.762' < 1.96 \text{ or } -'1.762' > -1.96$ $0.0390 > 0.025$
	There is insufficient evidence that [mean] mass is not 500g
4(a)	$[2 \times] z \times \frac{\sigma}{\sqrt{n}} = 1.414 \times [2 \times] 1.645 \times \frac{\sigma}{\sqrt{n}} \quad [z = 2.326]$
	$2\Phi('2.326') - 1$
	$\alpha = 98 \text{ (3 sf)}$
4(b)	$\frac{90}{'98'} = \frac{45}{49} \text{ or } 0.918 \text{ (3 sf)}$

6(a)	$N(2.5 + 0.8, 0.05 + 0.02) = N(3.3, 0.07)$
	$\frac{3.55 - '3.3'}{\sqrt{0.07}} [= 0.945]$
	$1 - \Phi('0.945')$
	$= 0.172 \text{ (3 sf)}$
6(b)	$E(D) = 2.5 - 3 \times 0.8 = 0.1$
	$\text{Var}(D) = 0.05 + 3^2 \times 0.02 = 0.23$
	$\frac{0 - ('0.1')}{\sqrt{0.23}} [= -0.2085 \text{ or } 0.209 \text{ or } 0.208]$
	$\Phi(' -0.2085') = 1 - \Phi('0.2085')$
	$= 0.417 \text{ (3 sf) or } 0.418$

7(a)	$[f(x) = -\frac{3}{4}(x^2 - 8x + 15)]$
	$-\frac{3}{4} \int_{4.5}^5 (x^2 - 8x + 15) dx$
	$= -\frac{3}{4} \left[\frac{x^3}{3} - 4x^2 + 15x \right]_{4.5}^5$
	$-\frac{3}{4} \left[\frac{125}{3} - 100 + 75 - \left(\frac{4.5^3}{3} - 4 \times 4.5^2 + 15 \times 4.5 \right) \right]$
	$= \frac{5}{32} \text{ or } 0.15625 \text{ or } 0.156 \text{ (3 sf)}$
7(b)	Median = 4
7(c)	$1 - 2 \times \left(\frac{5}{32} \right), \text{ or } 2(0.5 - \left(\frac{5}{32} \right))$
	$\frac{11}{16} \text{ or } 0.6875 \text{ or } 0.687 \text{ or } 0.688 \text{ (3 sf)}$