

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)	$\frac{90}{98} = \frac{45}{49} \text{ or } 0.918 \text{ (3 sf)}$

3(a)	Sample mean = 32.5 soi or Width = 2.96
	$32.5 + 1.96 \times \frac{\sigma}{\sqrt{100}} = 33.98 \text{ or } 2.96 = 2 \times 1.96 \times \frac{\sigma}{\sqrt{100}}$
	$\sigma = 7.55 \text{ (3 sf)}$
3(b)	Because the sample size is large.
3(c)	$0.95^r > 0.5$ Allow '='
	$r \ln 0.95 > \ln 0.5$ Allow '=' Correctly take logs and use log rule
	$r < 13.5 \dots$ Allow '='
	Largest value of r is 13

2(a)	$N(6, \dots)$
	$\sigma^2 = \frac{3}{2} = 1.5 \text{ (or } \sigma = \sqrt{1.5} \text{ or } \frac{\sqrt{6}}{2} \text{ or } 1.22 \text{ (3sf)})$
	$\frac{6.2 - 6}{\sqrt{\frac{1.5}{100}}}$
	$= 1.633$
	$P(\bar{X} > 6.2) = 1 - \Phi(1.633)$
	$= 0.0512 \text{ or } 0.0513 \text{ (3sf)}$
2(b)	Population (X) is not normally distributed / Population (X) is Binomial
3(a)	$\text{Est}(\mu) = \frac{2750}{60} \text{ or } \frac{275}{6} \text{ or } 45.8 \text{ (3 sf)}$
	$\text{Est}(\sigma^2) = \frac{60}{59} \left(\frac{127000}{60} - \left(\frac{275}{6} \right)^2 \right)$
	$= 16.2 \text{ (3 sf) or } \frac{2875}{177}$

3(b)	H_0 : Population mean time = 45 H_1 : Population mean time > 45
	$\frac{\frac{275}{6} - 45}{\sqrt{\frac{16.24294}{60}}}$
	= 1.602 to 1.595
	'1.602' < 1.645
	[Accept H_0] There is insufficient evidence [at 5% level] to reject the company's claim OR There is insufficient evidence to accept the passenger's belief OR There is insufficient evidence that the mean time is more than 45 minutes
6(a)	H_0 : Proportion (at college) owning Pumpkin phone = 0.25 H_1 : Proportion (at college) owning Pumpkin phone < 0.25
6(b)	$B(30, 0.1)$ and $P(X \geq 5)$ attempted
	$1 - (0.9^{30} + 30 \times 0.9^{29} \times 0.1 + {}^{30}C_2 \times 0.9^{28} \times 0.1^2 + {}^{30}C_3 \times 0.9^{27} \times 0.1^3 + {}^{30}C_4 \times 0.9^{26} \times 0.1^4)$ = $1 - (0.042391 + 0.141304 + 0.22766 + 0.236088 + 0.177066)$
	= 0.175 (3 sf) accept 0.176
6(c)	$\frac{1}{8} \pm z \sqrt{\frac{\frac{1}{8} \times \frac{7}{8}}{40}}$