1(a)	$s^2 = \frac{1}{9}\left('71314' - \frac{'844'^2}{10}\right) \quad \left[= \frac{134}{15} = 8.933\right]$
	2.262
	$\frac{'844'}{10} \pm '2.262'\sqrt{\frac{'8.933'}{10}}$
	[82.3, 86.5]
	The distribution of estimates of angles is normal. OR The estimates are a random sample from some population. OR The estimates are independent. OR Underlying distribution is normal.
1(b)	Population unlikely to be normal as θ is close to right-angle / data is skewed. OR Estimates may not be independent, for example due to collusion. OR No indication that sample is random.

2(a)	$p = \frac{e^{-2.8}(2.8)^3}{3!} \times 100 = 22.248$
	$q = \frac{(29 - 22.25)^2}{22.25} = 2.05$
2(b)	H_0: Po(2.8) fits the data. H_1: Po(2.8) does not fit the data. OR H_0: Po(2.8) is a satisfactory model for the number of cars (entering the car park). H_1: Po(2.8) is not a satisfactory model for the number of cars (entering the car park).
	$2.739 + 0.241 + 2.152 + '2.049' + 0.425 + 3.753 + 0.037 \quad [= 11.396]$
	$'11.4' < 12.59$, accept H_0 / do not reject H_0 / not significant.
	Insufficient evidence to suggest that Po(2.8) is not a good fit to the data. OR Insufficient evidence to suggest that the manager's claim is false.

4	$\frac{1}{4}\times 28\times(28+1)\quad [=203]$ $\frac{1}{24}\times 28\times(28+1)\times(56+1)\quad [=1928.5]$
	$[z=]\dfrac{T+0.5-'203'}{\sqrt{'1928.5'}}$
	$\dfrac{T+0.5-'203'}{\sqrt{'1928.5'}}>-2.576$
	$T>89.4$
	$T=90$

5(a)	$\dfrac{1}{16}\left[\dfrac{2}{3}x^{\frac{3}{2}}\right]_0^4+\dfrac{1}{k}\left[2\sqrt{x}\right]_4^9=1$ $\dfrac{1}{24}(8-0)+\dfrac{2}{k}(3-2)=1$ OR $\dfrac{1}{3}+\dfrac{2}{k}=1$
	$\dfrac{2}{k}=\dfrac{2}{3},\ k=3$
5(b)	$\frac{1}{16}\int_0^4\sqrt{x}\,\mathrm{d}x+\frac{1}{3}\int_4^m x^{-\frac{1}{2}}\,\mathrm{d}x=\frac{1}{2}$ OR $\frac{1}{3}\int_m^9 x^{-\frac{1}{2}}\,\mathrm{d}x=0.5$
	$\frac{1}{3}+\frac{2}{3}\left(\sqrt{m}-2\right)=\frac{1}{2}$ OR $\frac{2}{3}\left(3-\sqrt{m}\right)=\frac{1}{2}$
	$m=\frac{81}{16}\quad [=5.0625]$

5(c)	$\mathrm{F}(x)=\begin{cases}\frac{1}{24}x^{\frac{3}{2}} & 0\leqslant x<4\\ \frac{2}{3}x^{\frac{1}{2}}-1 & 4\leqslant x\leqslant 9\end{cases}$
	$\mathrm{G}(y)=\begin{cases}\frac{1}{24}y^{3} & 0\leqslant y<2\\ \frac{2}{3}y-1 & 2\leqslant y\leqslant 3\end{cases}$
	$\mathrm{g}(y)=\begin{cases}\frac{1}{8}y^{2} & 0\leqslant y<2\\ \frac{2}{3} & 2\leqslant y\leqslant 3\\ 0 & \text{otherwise}\end{cases}$
	Alternative method for question 5(c)
	Using chain rule (or inverse function): $\mathrm{G}(y)=\mathrm{F}\left(y^2\right)$ so $\mathrm{g}(y)=\frac{\mathrm{d}}{\mathrm{d}y}\mathrm{F}\left(y^2\right)=2y\mathrm{f}\left(y^2\right)$.
	$\mathrm{g}(y)=\begin{cases}2y\left(\frac{1}{16}\sqrt{y^2}\right) & 0\leqslant y<2\\ 2y\left(\frac{1}{3\sqrt{y^2}}\right) & 2\leqslant y\leqslant 3\end{cases}$
	$\mathrm{g}(y)=\begin{cases}\frac{1}{8}y^{2} & 0\leqslant y<2\\ \frac{2}{3} & 2\leqslant y\leqslant 3\\ 0 & \text{otherwise}\end{cases}$

7(a)	$\mathrm{G}_X(t)=a+2at+bt^2$
	$\mathrm{G}'_X(t)=2a+2bt$ $\mathrm{E}(X)=\mathrm{G}'_X(1)=2a+2b$
7(b)	$\mathrm{G}''_X(t)=2b$
	$\mathrm{Var}(X)=2b+(2a+2b)-(2a+2b)^2$
	$2b+(2a+2b)-(2a+2b)^2=2b+(2a+2b)(1-(2a+2b))$ $=2b+2(a+b)(1-2a-2b)$
	Alternative method for question 7(b)
	$\mathrm{E}\left(X^2\right)=0^2\times a+1^2\times 2a+2^2\times b=2a+4b$
	$\mathrm{Var}(X)=(2a+4b)-(2a+2b)^2$
	$(2a+4b)-(2a+2b)^2=2b+2a+2b-(2a+2b)^2$ $=2b+(2a+2b)(1-(2a+2b))$ $=2b+2(a+b)(1-2a-2b)$

7(c)	$G_Y(t) = (a + 2at + bt^2)^{10}$
	$G'_Y(t) = 20(a + bt)(a + 2at + bt^2)^9$ $E(Y) = 20(a + b)(3a + b)^9$
	$3a+b=1$, hence $E(Y) = 20(a + b) = 10E(X)$.
7(d)	Binomial
	$B\left(10, \frac{2}{3}\right)$