

1(a)	$4k + k + 4k + 9k = 1, k = \frac{1}{18}$									
	<table><tr><td>x</td><td>-2</td><td>1</td><td>2</td><td>3</td></tr><tr><td>$P(X = x)$</td><td>$\frac{4}{18}$</td><td>$\frac{1}{18}$</td><td>$\frac{4}{18}$</td><td>$\frac{9}{18}$</td></tr></table>	x	-2	1	2	3	$P(X = x)$	$\frac{4}{18}$	$\frac{1}{18}$	$\frac{4}{18}$
x	-2	1	2	3						
$P(X = x)$	$\frac{4}{18}$	$\frac{1}{18}$	$\frac{4}{18}$	$\frac{9}{18}$						
1(b)	$[E(X) = 28k =] \frac{14}{9}, 1.56$									
1(c)	$P(X \neq 2 X > 0) = \frac{\frac{10}{18}}{\frac{14}{18}}$									
	$= \frac{5}{7}, 0.714$									

2(a)	$\left[\frac{1}{6} \left(\frac{5}{6} \right)^7 \right] = 0.0465$
2(b)	$\left(\frac{5}{6} \right)^4 \left(\frac{1}{6} \right)^3 \times {}^6C_2$
	0.0335
3(a)	Median = [\$]32400
	[IQR = \$]33500 – [\$]31300
	= [\$]2200

3(b)	[Mean =] $\frac{878.3 + 896.5}{54} [= 32.867]$
	so [\$]32900
	[Variance =] $\left[\frac{28616.09 + 29815.63}{54} - \left(\frac{1774.8}{54} \right)^2 = \right]$
	$\frac{58431.72}{54} - \left(\frac{1774.8}{54} \right)^2$
	= 1.8511
	$\sigma = 1.36$, so $\sigma = [\text{\$}]1360$

6(a)	$P\left(\frac{148-155}{6} < Z < \frac{160-155}{6}\right)$
	$[= P(-1.1667 < Z < 0.8333)]$ $= \Phi(1.1667) + \Phi(0.8333) - 1]$ $= 0.7975 + 0.8784 - 1$ Or $(0.7975 - 0.5) + (0.8784 - 0.5)$ Or $0.2975 + 0.3784$
	= 0.6759
	[Expected number = $0.6759 \times 350 = 236.565$] 236

6(b)	$\frac{114 - \mu}{\sigma} = 1.406$ $\frac{99.5 - \mu}{\sigma} = -0.842$
	Solve, obtaining values for μ and σ $\mu = 105, \sigma = 6.45$
7(a)	$\left[\frac{10!}{2!2!3!} = \right] 151200$

7(b)	Method 1 [SC_ S _ _ _ _ _]
	$\frac{7!}{2!3!} \times 2 \times 7$
	= 5880
	Method 2 Considering each case separately [SC-S, S-CS]
	With Y $\frac{6!}{2!3!} \times 2 \times 7 = 840$ With H $\frac{6!}{2!3!} \times 2 \times 7 = 840$ With E $\frac{6!}{2!2!} \times 2 \times 7 = 2520$ With L $\frac{6!}{3!} \times 2 \times 7 = 1680$
	840 + 840 + 2520 + 1680
	= 5880

7(b)	Method 3 Considering each case separately [SC-S, S-CS]
	SCYS $\frac{7!}{2!3!} \times 2 = 840$
	SCHS $\frac{7!}{2!3!} \times 2 = 840$
	SCES $\frac{7!}{2!2!} \times 2 = 2520$
	SCLS $\frac{7!}{3!} \times 2 = 1680$
	$840 + 840 + 2520 + 1680$
7(c)	$= 5880$
7(c)	Method 1 Total arrangements with Ss at ends – arrangements with
	$\frac{8!}{2!3!} - \frac{6!}{2!}$
	$[= 3360 - 360]$
	$= 3000$

7(d)	Method 1
	[Number of ways with 3 Es =] ${}^7C_2 (= 21)$
	[Total number of ways is] ${}^{10}C_5 (= 252)$
	[Probability =] $\frac{21}{252}, \frac{1}{12}$
	Method 2
	$\frac{3}{11} \times \frac{2}{6} \times \frac{3}{11} \times {}^5C_2$
	[Probability =] $\frac{21}{252}, \frac{1}{12}$