4.3.10.

Let the three King cards be n, k, q respectively.

Probability of picking all the three King cards in a deck is $= p(n) \times P(k) \times P(q)$.

$= \frac{1}{52} \times \frac{1}{51} \times \frac{1}{50} = 7.54 \times 10^{-6}$.

5.1.1

c) Mean of the number of days to fix defects.

$\mu = \Sigma x P(x)$

$= (24.9 \times 1) + (2 \times 10.8) + (3 \times 9.1) + \ldots + (18 \times 0.10)$

$\mu = 416.50$.

d) Variance.

$Var\, x = (x - \mu)^2 P(x)$

6.3.5.

b) $P(X < 52\text{ cm})$

$Z = \frac{X - \mu}{\delta}$

$X = 52\text{cm}$
$\mu = 49.9$
$\delta = 3.74$

$\frac{(52 - 49.9)}{3.74} = 0.5615$

$P(Z < 0.5615) = 1 - P(Z > 0.5615) = 1 - 0.6985$

$= 0.3015$

c) $Z = \frac{X - \mu}{\delta}$

$P(X > 74)$

$\frac{74 - 49.9}{3.74} = 6.44$

d) $P(40.5 < X < 57.5)$

$\mu = 49.9 \quad \delta = 3.74$

$= P\left(\frac{40.5 - 49.9}{3.74} < Z < \frac{57.5 - 49.9}{3.74}\right)$

$= P(-2.51 < Z < 2.03)$

1-0.6985

6.5.3.

a) Random variable - Starting Salary for nurses.

b) $\mu_x = \mu = 67\,694$.

c) $\delta_x = \frac{\delta}{\sqrt{n}} = \frac{10,333}{\sqrt{42}} = 1594.42$.

d). the shape is a mound shaped.

e) $P(\bar{X} > 75,000)$.

$$Z = \frac{\bar{X} - \mu}{\delta/\sqrt{n}}$$

$$\frac{(75000 - 67694)}{1514.42/\sqrt{42}} = 31.26.$$

f) $P(x < 60000)$

$$Z = \frac{\bar{X} - \mu}{\delta/\sqrt{n}}$$

$$\frac{60000 - 67694}{1514.42/\sqrt{42}} = -32.93.$$

5.8.5.

b) Binomial probability distribution.

c) Draw a histogram.

$P(X) = \binom{n}{x} p^x (1-p)^{n-x}$. $n = 12$. $q = 0.76$.

$p = 0.24$

x	$P(X = x)$
0	0.037 ≈ 0.04.
1	0.14
2	0.24.
3	0.26.
4	0.18.
5	0.09.
6	0.03.
7	0.0092.
8	0.0018
9	0.00026.
10	0000024.
11	0.0000014.
12	3.7×10^{-8}.

e) Find the mean.

$\mu = np$.

$= 12 \times 0.24 = 2.88$.

f Find the variance.

$\sigma^2 = npq$.

$12 \times 0.24 \times 0.76 = 2.19$

$\sigma^2 = 2.19$

g. Find the standard deviation.

$\sigma = \sqrt{npq}$

$\sigma = \sqrt{2.19} = 1.48$

d) $P(X = 8)$

6.1.1

b) $P(2 < X < 5)$

$P(X) = (5-2) \times 0.1 = 0.3.$

$= 0.3.$

c). $P(7 < X < 10)$

$P(X) = (10-7) \times 0.1 = 0.3.$

d) $P(X = 8).$

$P(X) = 0 \times 0.1 = 0.$

$= 0.$

5.27

c) None are left handed

$X \sim bin(n, p)$

$P(x) = \binom{n}{x} p^x (1-p)^{n-x}$

$x = 0$

$n = 15$ $\quad p(0) = \binom{15}{0} 0.1^0 (1-0.1)^{15-0} = 0.2058 \approx 0.21$

$p = 0.1$

$1 \times 1 \times 0.2059 = 0.2059 \simeq 0.21$

d) Seven are left handed

$P(x) = \binom{n}{x} p^x (1-p)^{n-x}$

$x = 7$

$\binom{15}{7} 0.1^7 (0.9)^8 = 2.77 \times 10^{-4}$

e) At least two are left handed.

$P(X \geq 2) = P(2) + P(3) + P(4) + P(5) + \ldots + P(15)$ or

$1 - [P(0) + P(1)]$

$P(0) = 0.21$

$P(1) = \binom{15}{1} 0.1^1 (0.9)^{14} = ~~3.43~~ \; 0.34$

~~$1 - (3.43 + 0.21) = -2.64$~~ $\quad 1 - (0.34 + 0.21) = 0.45$

$P(X \geq 2) = 0.45$

5.2.7

f) At most three are left handed.

$P(X \leq 3)$

$P(0) + P(1) + P(2) + P(3) =$

$P(0) = 0.21$
$P(1) = 0.34$

$P(2) = \binom{15}{2} 0.1^2 (0.9)^{13} = 0.266 \approx 0.27$

$P(3) = \binom{15}{3} 0.1^3 (0.9)^{12} = 0.128 \approx 0.13$

$P(X \leq 3) = 0.95$

g) At least seven are left-handed

$P(X \geq 7) = 1 - \{P(0) + P(1) + P(2) + P(3) + P(4) + P(5) + P(6)\}$

$P(0) = 0.21$
$P(1) = 0.34$
$P(2) = 0.27$
$P(3) = 0.13$

$P(4) = \binom{15}{4} 0.1^4 (0.9)^{11} = 0.043$

$P(5) = \binom{15}{5} 0.1^5 (0.9)^{10} = 0.0105$

$P(6) = \binom{15}{6} 0.1^6 \; 0.9^9 = 1.94 \times 10^{-3}$

$1 - (1.00544)$

5.2.6.

$X \sim bin(n, p)$

$n = 23$. $p = 0.22$.

a) $P(X = 21)$

$P_x = \binom{n}{x} p^x q^{n-x}$

$P_x = \binom{23}{21} 0.22^{21} (1-0.22)^{(23-21)} = 2.39 \times 10^{-12}$

b) $P(X = 6)$

$P_x = \binom{n}{x} p^x (1-p)^{n-x}$

$P_x = \binom{23}{6} 0.22^{6} (1-0.22)^{(23-6)} = 0.1675 \approx 0.17$

c) $P(X = 12)$

$P_x = \binom{n}{x} p^x (1-p)^{n-x}$

$P_x = \binom{23}{12} 0.22^{12} (1-0.22)^{(23-12)} = 1.1300 \times 10^{-3}$.

5.2.6

e) $P(x \geq 17) = 1.66 \times 10^{-7}$

$P(17) + P(18) + P(19) + P(20) + P(21) + P(22) + P(23)$.

$P(x) = \binom{17}{x} p^x (1-p)^{17-x}$

$P(17) = \binom{23}{17} 0.22^{17} (1-0.22)^{6} = 1.51 \times 10^{-7}$.

$P(18) = \binom{23}{18} 0.22^{18} (1-0.22)^{5} = 1.42 \times 10^{-8}$.

$P(19) = \binom{23}{19} 0.22^{19} (1-0.22)^{4} = 1.05 \times 10^{-9}$. +

$P(20) = \binom{23}{20} 0.22^{20} (1-0.22)^{3} = 5.93 \times 10^{-11}$.

$P(21) = \binom{23}{21} 0.22^{21} (1-0.22)^{2} = 2.39 \times 10^{-12}$.

$P(22) = \binom{23}{22} 0.22^{22} (1-0.22)^{1} = 6.13 \times 10^{-14}$

$P(23) = \binom{23}{23} 0.22^{23} (1-0.22)^{0} = 7.51 \times 10^{-16}$

1.66×10^{-7}

c.) Find the variance and standard deviation

Number of defects	$(x-\bar{x})$	$(x-\bar{x})^2 \times 10^6$
5863	3873	15.000129
4613	2621	6.869641
1992	0	0
1838	-154	2.371600
1596	-396	1.568160
1546	-446	1.989160
1485	-507	2.570490
1398	-594	3.528360
1371	-621	3.856410
1130	-862	7.430440
1105	-887	7.867690
976	-1016	1.032256
976	-1016	1.032256

$\bar{x} = 1992$ $\quad\quad \Sigma = 33.246822$

$V = 33.246822 \times 10^6$

$S = \sqrt{V}$

$= \sqrt{33.246822 \times 10^6}$

$= 5.766$

4.2.1

Blue	Brown	Green	Orange	Red	Yellow	Total
481 (5.4)	371 (7.1)	483 (5.4)	544 (4.8)	372 (7)	369 (7.1)	2620

a.) P(Green or Red) = P(Green) + P(Red)

= 5.4 + 7

= 12.4

b.) P(Blue, Red or Yellow) = P(Blue) + P(Red) + P(Yellow)

= 5.4 + 7 + 7.1

= 19.5

c.) P(not choosing Brown) = 1 - P(Brown)

= 1 - 7.1

= |6.1|

= 6.1

2.24

Class	F	R.F	C.F
114 - 148.4	10	0.29	10
148.4 - 182.8	13	0.37	23
182.8 - 217.2	10	0.29	33
217.2 - 251.6	1	0.03	34
251.6 - 286	1	0.03	35
	$\Sigma 35$	1	

$$R.F = \frac{F}{\Sigma F}$$

$$\frac{10}{35} = 0.29$$

$$\frac{13}{35} = 0.37$$

$$\frac{10}{35} = 0.29$$

$$\frac{1}{35} = 0.03$$

$$\frac{1}{35} = 0.03$$

2.3.5

4.2.1.

d.) $p(\text{not choosing Green}) = 1 - p(5.4)$

$= 1 - 5.4$

$= 4.4$

- Every woman with a higher life expectance has a lower fertility rate.
- Every woman with high fertility rate has a lower life expectency.
- The ~~life~~ fertility rate of every woman ranges from 1 - 7. exclusively.

3·1·13

~~Tests~~	worth	
test 1	15%	85
test 2	15%	76
test 3	15%	83
homework	10%	74
project	20%	65
final exam	25%	79

$$\begin{array}{r} 12.75 \\ +\ 11.4 \\ \hline 24.15 \\ +\ 12.45 \\ \hline 36.60 \\ +\ 7.4 \\ \hline 44.00 \end{array} \qquad \begin{array}{r} 44.00 \\ +\ 13.00 \\ \hline 57.00 \\ +\ 19.75 \\ \hline 76.75 \end{array}$$

$\frac{15}{100} \times 85 = 12.75$ $\frac{15}{100} \times 83 = 12.45$ $\frac{20}{100} \times 65 = 13$

$\frac{15}{100} \times 76 = 11.4$ $\frac{10}{100} \times 74 = 7.4$ $\frac{25}{100} \times 79 = 19.75$

$\Rightarrow 76.75$

3.2.4

a.) Find the mean and median

Total No. of defects = 25,891

$$\text{mean} = \frac{25891}{13}$$

$$= 1{,}991.62$$

Median = 1485 (wrong) shape

b.) Find the range

$$\frac{\text{Max} - \text{min}}{13}$$

$$\left(\frac{5865 - 976}{13}\right)$$

$$= 376.1$$