5.2.7

f) At most three are left handed.

$P(X \le 3)$

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

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

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

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

$P(X \le 3) = 0.95$

g) At least seven are left-handed

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

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

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

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

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

$1 - (1.00544).$

h) This is ~~not~~ unusual because 10% of all the people in the world are left handed. And these ~~present~~ presidents are in power without replacements. So it means that the Left-handed people are born for greatness.

5.3.5. d) ~~T~~ The histogram is skewed to the left

6.1.1.

a) X = The waiting during the peak hours.

b) $P(x) = \frac{1}{\ }$

4.2.1

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

a) $P(\text{Green or Red}) = P(\text{Green}) + P(\text{Red})$

$= 5.4 + 7$

$= \underline{12.4}$

b) $P(\text{Blue, Red or Yellow}) = P(\text{Blue}) + P(\text{Red}) + P(\text{Yellow})$

$= 5.4 + 7 + 7.1$

$= \underline{19.5}$

c) $P(\text{not choosing Brown}) = 1 - P(\text{Brown})$

$= 1 - 7.1$

$= |6.1|$

$= \underline{6.1}$

3.2.4

c.) Find the variance and Standard deviation

Number of defects	$(x-\bar{x})$	$(x-\bar{x})^2 \times 10^6$
5865	3873	15.000129
4613	2621	6.8.69641
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

$\bar{x} = 1992$

$\Sigma = 33.246822$

$V = 33.246822 \times 10^6$

$S = \sqrt{V}$

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

$= 5.766$

5·1·1

g) It is not unusual for a lens to take 16 days to fix the defect since we have its probability at 99·8% to fix a defect showing that it is almost accurately 16 days

h) I would think that Eyeglassomatic manufacturers take too long maybe because they do not have the necessary equipments, or they do not have skilled manpower or they do not have competitors.

5·2·6

d) $P(X \leq 14)$

$$P(X \leq 14) = 1 - \left[P(15) + P(16) + P(17) + P(18) + P(19) + P(20) + P(21) + P(22) + P(23)\right]$$

$$P(15) = \binom{23}{15} 0.22^{15} (1-0.22)^{8} = 9.2 \times 10^{-6}$$

$$P(16) = \binom{23}{16} 0.22^{16} (1-0.22)^{7} = 1.3 \times 10^{-6}$$

$P(17) = 1.51 \times 10^{-7}$

$P(18) = 1.42 \times 10^{-8}$

$P(19) = 1.05 \times 10^{-9}$

$P(20) = 5.93 \times 10^{-11}$

$P(21) = 2.39 \times 10^{-12}$

$P(22) = 6.13 \times 10^{-14}$

$P(23) = 7.51 \times 10^{-16}$

$$= 1 - \left[1.07 \times 10^{-5}\right]$$

$$= 0.99$$

4.3.10.

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

$P(n)$ – 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.

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

$$= (24.9 \times 1) + (2 \times 10.2) + (3 \times 9.1) + \ldots + (18 \times 0.10)$$

$$\mu = 416.50.$$

d) Variance

$$Var\ X = (X - \mu)^2 P(X)$$

e) Standard deviation

$$\delta = \sqrt{Variance}$$

$$= \sqrt{(X - \mu)^2 P(x)}$$

f) $P(X \le 16)$.

$$= 1 - \{P(17) + P(18)\}$$

$$= \overset{100}{\cancel{1}} - \{0.1 + 0.1\}$$

$$100 - \{0.2\} = 99.8\%$$

5.2.6

f) $P(X \leq 9)$.

$$= \binom{23}{9} 0.22^{9} (1-0.22)^{14}$$

$$= 0.03.$$

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

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

$$\frac{(5865 - 476)}{13}$$

$$= 376.1$$

4.2.1.

d.) p (not choosing green) = 1 - p (5'.4)

= 1 - 5'.4

= 4.4