

51 JAN 08

1) $S_{xx} = 60475 - \frac{773^2}{10} = 722.1$ $\bar{x} = 773$ $\bar{y} = 724$

$S_{yy} = 53122 - \frac{724^2}{10} = 704.4$ $PMCC = \frac{110.8}{\sqrt{722.1 \times 704.4}} = 0.1551$

$S_{xy} = 56076 - \frac{773 \times 724}{10} = 110.8$

b) Since PMCC is so close to zero there is very little evidence to suggest correlation exists.

2) $\bar{x} = \frac{2757}{12} = 229.75$ $Var = \frac{\sum x^2 - \bar{x}^2}{12} = \frac{724961 - 229.75^2}{12}$

$Var = 7628$ $\sigma = \sqrt{7628} = 87.3$

b) 125, 160, 169, 171, 175, 186, 210, 243, 250, 258, 390, 420

$Q_1 = \frac{x_2 + x_4}{2} = 198$ $Q_3 - Q_1 = 104 = 84$

$Q_2 = \frac{x_n}{2} = 6$ $Q_2 = \frac{x_6 + x_7}{2} = 254$ $Outlier\ limit = 254 + 1.5 \times 84 = 380$

$Q_3 = \frac{x_9}{2} = 9$ $Q_3 = \frac{x_9 + x_{10}}{2} = 380$

Band f have been smoking more than 1 pack per day.

3) Area \propto frequency Area = $k \times$ frequency

Total Area = $1 \times 6 + 1 \times 7 + 4 \times 2 + 2 \times 6 + 3 \times 5 + 5 \times 2 + 3 \times 1 + 5 + 0.5 \times 12$
 Total Area = 70 Total frequency = 140

Area = $\frac{1}{2} \times$ frequency Area = $0.5 \times 12 = 6 \Rightarrow$ frequency = 12

4) $S_{xx} = 188 - \frac{41^2}{10} = 19.9$ $S_{xy} = 1818.5 - \frac{41 \times 406}{10} = 153.9$

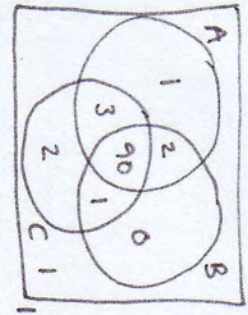
b) $b = \frac{S_{xy}}{S_{xx}} = 7.73$ $a = \bar{y} - b\bar{x} = 40.6 - 7.73 \times 4.1 = 8.89$

$y = 8.89 + 7.73x$

gradient indicates an increase of 7730 miles per year
 $8.89 + 7.73 \times 4 = 47.54$ 47540 miles

- 5) b) $\frac{1}{100}$ c) $\frac{4}{100}$ d) $\frac{3}{100}$

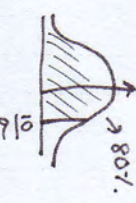
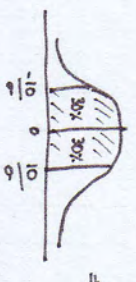
- e) $\frac{6}{100}$ f) $\frac{93}{96}$



6) $n=200$ since normally distributed median = 200g.

b) $P(190 < W < 210) = 0.6 \Rightarrow P(\frac{190-200}{\sigma} < Z < \frac{210-200}{\sigma}) = 0.6$

$\Rightarrow P(-\frac{10}{\sigma} < Z < \frac{10}{\sigma}) = 0.6$



$P(Z < \frac{10}{\sigma}) = 0.8$
 $\Phi(\frac{10}{\sigma}) = 0.8 \Rightarrow \frac{10}{\sigma} = 0.84$
 $\sigma = 11.9$

c) $P(W < 180) \Rightarrow P(Z < \frac{180-200}{11.9}) \Rightarrow P(Z < -1.68) = 1 - \Phi(1.68) = 0.046$

7) $P(R=3 \text{ and } B=0) = \frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$

b)	3	0	3	6	9
	2	0	2	4	6
	1	0	1	2	3
	0	0	0	0	0
	0	1	2	3	

c) $E = 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 6 \quad 9$ $a = \frac{7}{16} \quad b = \frac{1}{16} \quad c = \frac{1}{16}$
 $P = \frac{1}{16} \quad \frac{1}{16} \quad \frac{2}{16} \quad \frac{2}{16} \quad \frac{1}{16} \quad \frac{2}{16} \quad \frac{1}{16}$ $d = \frac{1}{16}$

$E(E) = 0 + \frac{7}{16} + \frac{4}{16} + \frac{6}{16} + \frac{6}{16} + \frac{1}{16} + \frac{12}{16} + \frac{9}{16}$
 $E(E) = \frac{9}{4}$

$V(E) = 0 + \frac{7}{16} + \frac{4}{16} + \frac{8}{16} + \frac{18}{16} + \frac{1}{16} + \frac{72}{16} + \frac{81}{16} = \frac{49}{4}$

$V(E) = E(E^2) - (E(E))^2 = \frac{49}{4} - (\frac{9}{4})^2 = \frac{115}{16}$