

MST	Year	General	5 Yearly	2006
1) D	2) C	3) D	4) B	5) B
6) C	12) B	7) A	10) B	15) A
11) C	14) A	13) C	14) A	15) A

Question 21

A) $I = PRN$
 $= 12,000 \times 0.075 \times 6$
 $= \$5400$

B) $2(p+q) - 3(p-q) = 2p+2q-3p+3q$
 $= 5q - p$
 C) $13M + 17F = 30 \text{ people}$

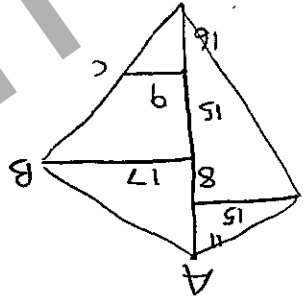
II) 2 (male)

III) 22

IV) Males $38 - 2 = 36$ Females $48 - 4 = 44$
 $\therefore$ Females have largest range

D) 0.5 mL

II) $0.5 \times 100 = 3 \frac{1}{3} \%$



II) $BC^2 = 8^2 + 15^2$
 $= 64 + 225$
 $= 289$
 $BC = \sqrt{289}$
 $= 17 \text{ m}$

Question 22

A) Int $3400 - 2800 = 600$
 $I = PRN$
 $600 = 2800 \times R \times 3$
 $600 = 8400 \times R$
 $R = 0.0714$
 $= 7.14\%$

B) $\sin \theta = \frac{23}{42}$
 $\theta = 33^\circ 12'$

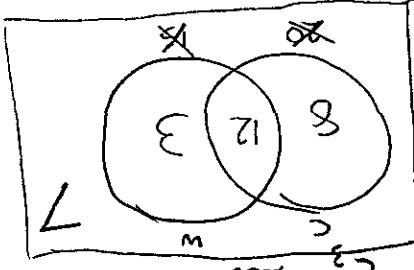
C) $\sqrt[3]{\frac{p+3}{p+3}} = 2$
 $\frac{p+3}{p+3} = 8$
 $\frac{7}{p+3} = 53$
 $p+3 = 56$
 $p = 53$

D) $A = \pi(R^2 - r^2)$
 $= \pi(2.3^2 - 0.9^2)$
 $= 14.1 \text{ m}^2$

II) $V = 14.1 \times 7.2 \times 20$
 $= 2,030.4 \text{ m}^3$

E) $14 \times 2 = 28$

II) $26 \times 3 = 78$



$20 + 15 + 7 = 42$
 $42 - 30 = 12$

Both = 12 students

Question 23

A) 19 boxes contain less than 50 matches
 $\therefore 62\%$ contain 50 or more
 $\therefore$ the claim is reasonable

II) 50 scores: $Q_1 \leq 12$, $Q_3 \leq 37$

IQR = $50 - 49$

$= 1$

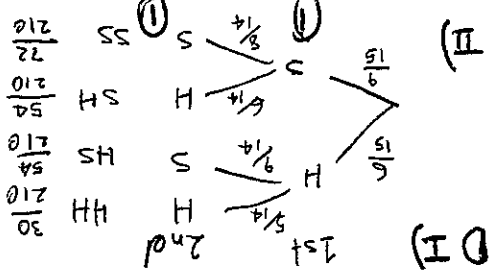
III) median of 25th and 26th scores
 $\therefore$ median = 50

IV) # with 50
 $40 - 19 = 21$
 $P(50) = \frac{21}{50}$

B) 3.4748×10^{16}

II) 2^{11}

C) $A = P(1+r)^n$
 $21,000 = 7,000(1+0.06)^n$
 $\frac{21,000}{7,000} = (1.06)^n$
 $3 = 1.06^n$
 $\log 3 = \log 1.06^n$
 $\log 3 = n \log 1.06$
 $n = \frac{\log 3}{\log 1.06} = 19.026$
 $\therefore$ after 19 years



III) $P(H \text{ and } S) = \frac{54}{210} \times 2$

$= \frac{108}{210}$

$= \frac{18}{35}$

Question 24
 AI) $r = 0.078 \div 26 = 0.003$

II) $n = 26 \times 3 = 78$
 $A = M \left[\frac{r}{(1+r)^n - 1} \right]$

$A = 200 \left[\frac{0.003}{1.003^{78} - 1} \right]$
 $= \$17,546.79$

III) $200,000 = M \left[\frac{0.003}{1.003^{152} - 1} \right]$
 $n = 26 \times 7$

$200,000 = M \times 241.6$
 $M = \$827.67$

BI) $\bar{x} = 22$
 $\sigma_n = 9.56$

II) $42 - 14 = 28$

III) Both sets of scores are skewed
 The home scores have a higher median
 The home scores have both a higher range and IQR

C)
 $E = \frac{1}{2} m v^2$
 $\frac{1}{2} E = m v^2$
 $v = \sqrt{\frac{2E}{m}}$

Question 25
 A) $\tan 58 = \frac{4}{5}$
 $h = 5 \tan 58 = 8.00m$

BI) $N = M \left[\frac{r(1+r)^n - 1}{(1+r)^n - 1} \right]$
 $350,000 = M \left[\frac{0.0054 \times 1.0054^{360} - 1}{1.0054^{360} - 1} \right]$
 $350,000 = M \times 158.54$
 $M = \$2,207.64$

II) Repay = $2,207.64 \times 12 \times 30$
 $= \$794,750.40$

III) Int = $794,750.40 - 350,000$
 $= \$444,750.40$

IV) $350,000 = M \left[\frac{1.0054^{180} - 1}{0.0054 \times 1.0054^{180}} \right]$
 $n = 15 \times 12 = 180$

$350,000 = M \times 114.9$
 $M = \$3045.03$
 Repay = $3045.03 \times 12 \times 15$
 $= 548,105.40$
 Save = $794,750.40 - 548,105.40$
 $= \$246,645$

C I) $m = \frac{rise}{run} = \frac{20/40}{1/2} = \frac{1}{2}$
 $y = mx + b$
 $C = \frac{1}{2}d + 40$

II) You play a flat rate, no matter how far you travel
 DI) $3 \times 2 \times 2 = 12$
 II) $3 \times 1 \times 2 = 6$

3) $r = 6.3 \div 2 = 3.15\%$
 $n = 10 \times 2 = 20$
 $A = P(1+r)^n$
 $= 7000 \times 1.0315^{20}$
 $= \$13,016.15$
 $= \$1550$
 4) $4000 \times 0.2 + 3000 \times 0.25 = \1550
 5) 18 holes, $\therefore$ av of 9th and 10th 5-0105

6) $30 + 4 \times 10 = 70$
 7) 1cm: 10,000cm
 $200 \div 100 = 2cm$
 $\therefore (5, 13)$

10) 4 discs taken $\therefore$ 48 cards left
 $P(K) = \frac{4}{48} = \frac{1}{12}$

II) $\frac{1}{3} \times \frac{1}{2} \times 1 = \frac{1}{6}$
 $\approx 17\%$

12) $12 - 1 = 0.4$
 $10^{-7} = 0.0000007$
 $\sin 20 = 0.34$
 $3 - \pi = -0.14$
 as $P(E) > 0$, only D

13) $5a = a + 120$
 $4a = 120$
 $a = 30$

14) $\frac{1457.87}{1.12} \approx 1301.6$

15) $23 \times g + 35 \times c + 20 = 23g + 35c + 20$