HW #8 KEY

Section 9.1

1) Sample: HHH; HHT; HTH, THH;

HTT; THT; TTH; TTT

b) at least two heads: HHH; HHT, HTH, THH.

c) no more than one head HTT; THT; TTH, TTT

2) a) HT, HH, T1; T2, T3, T4, T5, T6.

b) T4, T5, T6

c) HH

3) a) 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48

b) 12, 24, 36, 48

c) [illegible], 36

6) a) 72 students, 12+9 = 21 going to college

$\Rightarrow$ probability = $21/72$

b) $72 - 21 = 51$ students NOT going to college.

$\Rightarrow$ probability $51/72$.

c) Two events here 1) a girl: probability $44/72$

2) who's not going to college: $32/44$

To get joint probability, multiply. $\frac{\cancel{44}}{72} \cdot \frac{32}{\cancel{44}} = \boxed{\frac{32}{72}} = \frac{4}{9}$.

8) There are 3 face cards per suit, 2 black suits $\Rightarrow$ 6 black face cards.

$P = \frac{6}{52}$.

10) 0 heads - 1 (TTTT)

1 head - 4 (HTTT, THTT, TTHT, TTTH)

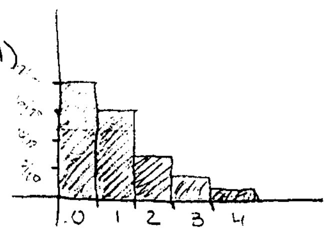
2 heads - 6 (HHTT, HTHT, HTTH, THHT, THTH, TTHH)

3 heads - 4 (HHHT, HHTH, HTHH, THHH)

4 heads - 1 (HHHH)

12) SAME as problem 10, but instead of HT use TF.

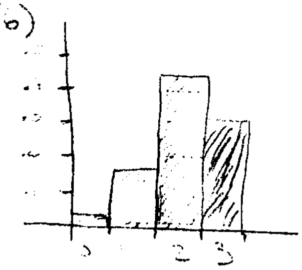
14)



$P \le 2$ shaded : $\frac{8}{20} + \frac{6}{20} + \frac{3}{20} = \frac{17}{20}$

$P \ge 2$ remainder. $1 - \frac{17}{20} = \frac{3}{20}$.

16)



$P(1 \le x \le 2)$ shaded $.189 + .441 = .630$

$P(x < 2)$: $.027 + .189 = .216$

↳ $P(0) + P(1)$

17) a. gggg, gggb, ggbg, gbgg, bggg

gbbg; bogb; bggb; bbgg; bgbg

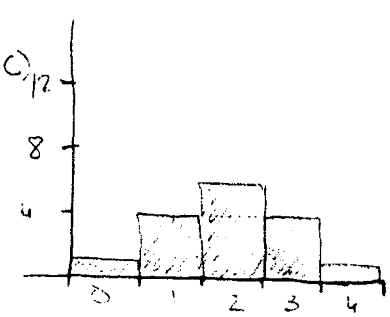
ggbb; gbbb; bgbb; bbgb; bbbg,

bbbb.

b)

X	0	1	2	3	4
P(X)	1	4	6	4	1

c)



d) We take $P(1) + P(2) + P(3) + P(0)$ (shaded): $1 + 4 + 6 + 4 = 15/16$.

22) $\mu(x) = x_1 P_1(x) + x_2 P_2(x) + \ldots$

$V(x) = (x_1-\mu)^2 P(x_1) + (x_2-\mu)^2 P(x_2) + \ldots$

$\sigma = \sqrt{V(x)}$

Here, $\mu = \frac{4}{10}\cdot 1 + \frac{2}{10}\cdot 2 + \frac{2}{10}\cdot 3 + \frac{1}{10}\cdot 4 + \frac{1}{10}\cdot 5 = \frac{4+4+6+4+5}{10} = \frac{23}{10}$

$E(x) = 1\cdot\frac{4}{10} + 2\cdot\frac{2}{10} + 3\cdot\frac{2}{10} + 4\cdot\frac{1}{10} + 5\cdot\frac{1}{10} = \boxed{\frac{23}{10}}$

$V(x) = \left(1-\frac{23}{10}\right)^2\left(\frac{4}{10}\right) + \left(2-\frac{23}{10}\right)^2\left(\frac{2}{10}\right) + \left(3-\frac{23}{10}\right)^2\left(\frac{2}{10}\right) + \left(4-\frac{23}{10}\right)^2\left(\frac{1}{10}\right) + \left(5-\frac{23}{10}\right)^2\left(\frac{1}{10}\right)$

$= \frac{181}{100} = 1.81$

$\sigma = \sqrt{1.81}$. (1.345)

24) $\mu = -5000\cdot(.008) - 2500(.052) + 300(.940) = 112$

$E(x) = \mu = 112$

$V(x) = (-5000-112)^2(.008) + (-2500-112)^2(.052) + (300-112)^2(.940) = 597{,}056$

$\sigma = \sqrt{597056} \approx \ldots$

27) a) $E(x) = 10\cdot .25 + 15\cdot .30 + 20\cdot .25 + 30\cdot .15 + 40\cdot .05 = 18.5$

b) $\sigma(x) = \sqrt{(10-18.5)^2(.25) + (15-18.5)^2 .30 + (20-18.5)^2(.25) + (30-18.5)^2(.15) + (40-18.5)^2(.05)} = \sqrt{18.0625 + 3.675 + .5625 + 19.8375 + 23.1125}$

$= \sqrt{65.25} = \boxed{8.078}$

$R = 18.5(1000)(2.95) = \boxed{54575}$