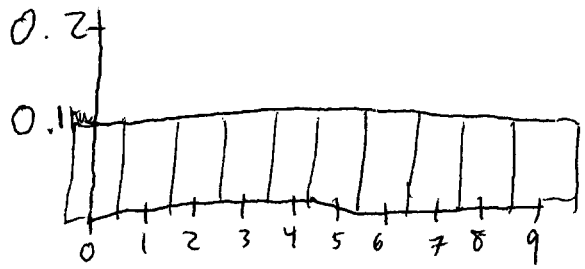
Probability + Statistics

Post-class Problems Nov. 2

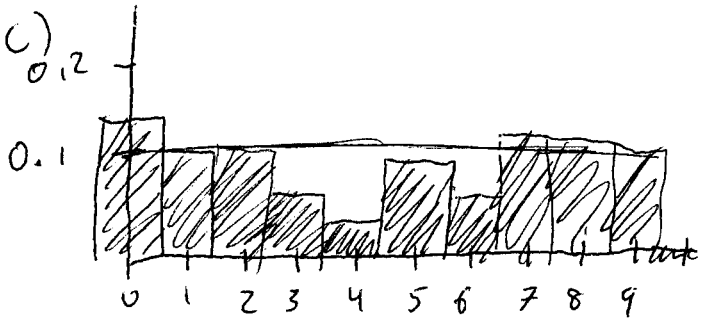
2.1 5) a) $f(x) = 1/10$; $x = 0, 1, \ldots, 9$

PMF



b) 21, 15, 16, 13, 6, 15, 13, 17, 17, 17

c)



d) $\mu = 4.5$, $\bar{X} = \frac{671}{150}$, $\sigma^2 = 8.25$, $S_x^2 = 9.6067$

e) 8, 13, 15, 10, 12, 10, 4, 9, 15, 0

$\bar{y} = 3.9375$, $S_y^2 = 6.9645$

g) $P(\text{no defectives}) = \frac{95C_{10}}{100C_{10}}$ ← number of possible samples w/ no defects; ← total possible number of samples

$P(\geq 1 \text{ defect}) = 1 - P(\text{no defects})$

$= 0.41625$

11) a) $g(y) = \frac{365!(y-1)}{(366-y)!\,365^y}$, $y = 2, 3, \ldots, 366$

b) $\mu = 24.6$, $\sigma^2 = 148.64$, $\sigma = 12.1918$

2.2 1) $E[X] = 3$, $E[X^2] = 11$

$$E[(X+2)^2] = E[X^2 + 4X + 4]$$
$$= E[X^2] + 4E[X] + 4$$
$$= 27$$

3) $E[X] = 0$, $E[X^2] = 8/9$

$$E[3X^2 - 2X + 4] = 3E[X^2] - 2E[X] + 4$$
$$= 20/3$$

7) a) Average Class Size $= \frac{1000}{20}$ ← total students / ← total classes

$= 50$

b) $f(x) = \begin{cases} 0.4 & x = 50 \\ 0.3 & x = 100 \\ 0.3 & x = 300 \end{cases}$

c) $E(x) = 130$

9) a) (ii) $= 127/64$ (iii) $= \sqrt{7359}/64$ (iv) $= 1.6635$

b) (ii) $= 385/64$ (iii) $= \sqrt{7359}/64$ (iv) $= -1.6635$