

Probability + Statistics

Preclass Problems

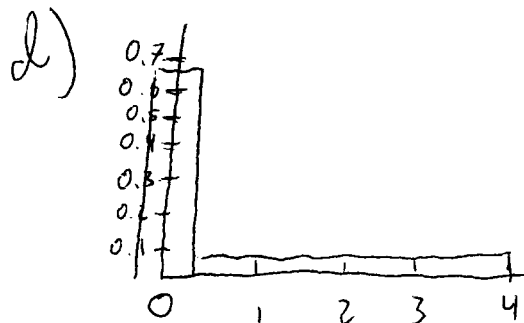
Nov 2

2.1 2) a) $f(x) = \begin{cases} \frac{9}{13}, & x=0 \\ \frac{1}{13}, & x=1, 2, 3, 4 \end{cases}$

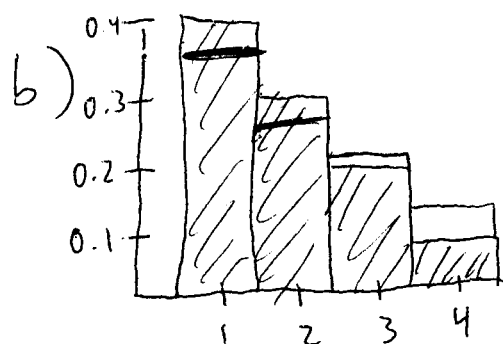
b) $P(X \geq 1) = P(1) + P(2) + P(3) + P(4)$
 $= \frac{1}{13} + \frac{1}{13} + \frac{1}{13} + \frac{1}{13}$
 $= \frac{4}{13}$

c) $M = \sum x f(x)$
 $= 0\left(\frac{9}{13}\right) + 1\left(\frac{1}{13}\right) + 2\left(\frac{1}{13}\right) + 3\left(\frac{1}{13}\right) + 4\left(\frac{1}{13}\right)$
 $= \frac{10}{13}$

~~σ^2~~ $\sigma^2 = \left(\sum x^2 f(x) \right) - M^2$
 $= 0^2\left(\frac{9}{13}\right) + 1^2\left(\frac{1}{13}\right) + 2^2\left(\frac{1}{13}\right) + 3^2\left(\frac{1}{13}\right) + 4^2\left(\frac{1}{13}\right) - \left(\frac{10}{13}\right)^2$
 $= \frac{290}{169}$



6) a) 0.38, 0.27, 0.21, 0.14



Prob Histogram Shaded

c) $\mu = 2$, $\bar{x} = 2.11$; $\sigma^2 = 1$, $s^2 = 1.149$

Z, Z

2) $E[X(11-X)] = \sum_{x=1}^{10} x(11-x)(1/10) = 22$

8) $E(Y) = E\left(\frac{X-\mu}{\sigma}\right) = \frac{1}{\sigma} [E(X) - \mu] = 0$

$$\begin{aligned}
 \text{Var}(Y) &= \text{Var}\left(\frac{X-\mu}{\sigma}\right) \\
 &= E\left[\left(\frac{X-\mu}{\sigma}\right)^2\right] - E[Y]^2 \\
 &= E\left[\frac{(X-\mu)^2}{\sigma^2}\right] \\
 &= \frac{1}{\sigma^2} \cdot E[(X-\mu)^2] \\
 &= \frac{1}{\sigma^2} \cdot \sigma^2 \\
 &= 1
 \end{aligned}$$