$E(X) = 1\cdot 0.05 + 2\cdot 0.1 + 4\cdot 0.35 + 8\cdot 0.4 + 16\cdot 0.1$

$= 6.45$

A+

b. $V(X) = 0.05(1-6.45)^2 + 0.1(2-6.45)^2 + 0.35(4-6.45)^2 + 0.4(8-6.45)^2 + 0.1(16-6.45)^2$

$= 15.64$

c. $SD(X) = \sqrt{Var(X)} = \sqrt{15.64} = 3.95$

d. $Var(X) = E(X^2) - E(X)^2$

$= 1^2\cdot 0.05 + 2^2\cdot 0.1 + 4^2\cdot 0.35 + 8^2\cdot 0.4 + 16^2\cdot 0.1 - (6.45)^2$

$= 15.64$

33. a $E(X^2) = \sum_{x=0}^{1} x^2 p(x)$

$= 0^2\times(1-p) + 1^2\times p$

$= p$

b. $V(X) = E(X^2) - (E(X))^2$

$E(X) = \sum_{x=0}^{1} x\,p(x)$

$= 0^2\times(1-p) + 1^2\times p = p$

$V(X) = p - p^2$

$= p(1-p)$

c. $E(X^{79}) = \sum_{x=0}^{1} x^{79} p(x)$

$= 0^{79}\cdot(1-p) + 1^{79}\cdot p$

$= p$

32. $P(X=i) = \frac{1}{6}$

$\$(\frac{1}{5.5}) \approx \$\ 0.29$

$E(h(X)) = \sum_{i=1}^{6} \frac{1}{i} P(X=i)$

$= \frac{1}{6}\left[\sum_{i=1}^{6} \frac{1}{i}\right]$

$= \frac{1}{6}\left[1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6}\right]$

$= 0.41$

$\$0.41 > \$0.29$, we will accept gamble

41. $V(aX+b) = E[(aX+b) - E(aX+b))^2]$

$= E[(aX+b - a\mu - b)^2]$

$= E[a^2(X-\mu)^2]$

$= a^2 E[(X-\mu)^2]$

$= a^2 V(X)$

$V(X) = \delta^2$, $V(aX+b) = a^2\delta_X^2$