Question 1, Part 1:

Prove **E(a+bx) = a + bE(x)**

* **∑** (aX + b) = Sum of a\*x + b
* **∑** (ax + b)\*p(x) = Sum of all a\*x + b multiplied by each x’s respective probability
* **∑**  ax\*p(x) + ∑ b\*p(x) = Distribute the p(x) and split then sum each function
* a **∑**  x\*p(x) + b **∑** p(x) = Remove the constant from each sum function
  + (2\*5x) + (2\*6x) = 2\*(5x+6x)
* **∑** p(x) = 1 = Sum of all probabilities equals 1
* a **∑** (X) + b

Question 1, Part 2:

**Prove Var(a+bx) = b^2 var(x)**

* Var(a + bX) = Variance of a + b\*x
  + Var(x) = **∑** (x- expected value(x))2 = Variance Formula
* **∑** [{(a + bX) − E(a + bX)}2] =
* **∑** {a + bX – b\*E(X) - a}2] =
* **∑** [b\*(X − E(X)}2] =
* **∑** b2\*[X − E(X)]2 =
* b2 **∑** [X − E(X)]2 =
  + Var(x) = **∑** (x- expected value(x))2
* b2 **∑** [X − E(X)]2

Question 2:

**Calculate the mean and standard deviation of a continuous uniform distribution of x between a and b**

* Mean of Continuous Uniform Distribution
  + mean(x) = *f*(*x*) *dx =* mean of a continuous uniform distribution
  + *f(x)* = 1/(b-a)
  + mean(x) = \*(1 / (b-a))*dx* : Substitute mean probability function for *f(x)*
  + mean(x) = x2/2 \* (1 / (b-a)) |ab : Integrate function
  + mean(x) = b2 – a2 / 2\*(b-a) : Substitute x for (b, a) to compute definite interval
  + mean(x) = b+a / 2
* Standard Deviation of Continuous Uniform Distribution
  + Var(x) = E(X2) – [E(X)]2
    - E(X) = b+a / 2
  + Var(x) = 2\*(1 / (b-a))*dx –* (b+a / 2)2
  + Var(x) = (x3/3) \* (1 / (b-a))- (b+a / 2)2
  + Var(x) = (b3 – a3 / 3) \* (1 / (b-a))
  + Var(x) = ((b2 + ab + a2)/3) – (b2 + 2ab + a2 / 4)
  + Var(x) = (b-a)2 / 12
  + StD(x) =| b – a / sqrt(12)|