**difference between expected value and mean**

Avg Vs Expected Value.

Avg is a special scenarios of expected values while all probabilities are equal.

Avg = X = my = (SUM (x) / n ) – sum of all values div by number of values

Expected Value = Expectation of X = Summation (n =1 to n = z) with value \* prob of that value occurring

*Example – Students that Scored a Certain Value of Their Test*

76, 81, 100, 92. Avg = x,y,z,a / 4

There are 4 results – so if we wrote each down and threw it into a pot then there would be a 1 in 4 chance of pulling any one out (we need to know that p value as we plug it in momentarily.

Expected Value = E[x] = 76(1/4) + 81(1/4) + 100(1/4) + 92(1/4)

¼ (76 + 81 + 100 + 92)

Remember that there is an equal probability of pulling out any of the 4 values – hence all equal .25 and that the answer in this scenario is Avg = Expected Value

*BUT what if there isn’t equal probability?*

Rolling a fair die = (1 + 2 + 3 + 4 + 5 + 6) / 6 = 21 / 6 = 3.5

Now, imagine if not an equal die!

5,6 = 1/5 others are 3/20

Expected Value = 1(3/20) + 2(3/20) + 3(3/20) + 4(3/20) + 5(1/5) + 6(1/5)

(3/20) \* (1+2+3+4) + (1/5)\*(5+6) = 3.7

Another Example – Working Different Jobs

$20/hr for 8/hrs week

$12/hr for 16/hrs week

Average = ((20 + 12) / 2) = Avg $16 per hour \* 24 hours worked in a week = **$384/wk**

Expected Value = (20\*8)+(12\*16) = $**352 per week – Weighted Average is More Useful!**

Average = Expected Value if all values have a equal probability of occurring.

Expected Value = takes into account, weighted