

## Topic 1 for chapter 6 is random variables

A few rules....means can add and subtract, but standard deviations don't.

Lets say we have two peoples running times in a half marathon.

Coach Pines  $N(120 \text{ min}, 12 \text{ min})$

Coach Enright  $N(145 \text{ min}, 8 \text{ min})$

**Remember the first number is the mean and the second is the StDev**

If we want to combine their data together(add the means) but the Standard deviations are different. We need to square them, add them, then take the square root.

If we want the difference between(subtract the means) and the standard deviations is exactly the same as above....we square them, add them, then take the square root.

Check out the Seinfeld powerpoint which shows this situation...I call these problems where you combine data the "Team Type Problem"

Solution below

**Combine** Pines + Enright  
 $N(265 \text{ min}, 14.422)$   
Combined

**Difference**  
 $N(25 \text{ min}, 14.422)$   
Diff

$$\begin{array}{c} \text{StDev's} \\ \hline \sqrt{12^2 + 8^2} = 14.422 \end{array}$$



same StDev

## Topic 2..... payout tables

Usually multiple choice....put the \$ amount into L1 on your calc and the prob into L2. Once this is done go to 1-var stats and make sure to use L1,L2 together(83 calcs) In the 84 calcs L2 is the Freq

The mean is the **Expected Value**.....they may ask for standard deviation also

### Topic 3....Binomial distribution

If something is binomial it should fit the following criteria:

P.O.T.I.

- P - prob the same for each trial
- O - outcome is either success or failure
- T - trials are fixed (they tell you n)
- I - each trial is independent

These problems are very calculator based.

If they use the word "exactly" then you will use the **binompdf** on your calc...in distribution menu (same place as normalcdf)

If they use any other wording: "less", "more" "at least" "at most" then use **binomcdf**

*Trials prob question*  
**binompdf**( n , p , x )

*↑  
adds up all cases*

**binomcdf**( n , p , x )

try to look at the ch6 binomial ppt on the website

examples below.

For all problems let's say the prob that Mr. Pines exercises on any given day is .45 and we can assume each day is independent.

(a) What is the probability that he exercises exactly 3 times in the next 10 days?

$$\text{binompdf}(10, .45, 3) = \boxed{.1665}$$

*same as*

$$\binom{10}{3} (.45)^3 (.55)^7$$

*↙ lot more work*

(b) What is the probability that he exercises less than 6 times in the next 20 days?

$$\text{binomcdf}(20, .45, 5) = \boxed{.0553}$$

*← 0+1+2+3+4+5*

*cdf adds them up*

*↑  
# that tells calc to stop adding ... calc always starts at zero*

(c) What is the probability that he exercises more than 2 times in the next 10 days?

$$1 - \text{binomcdf}(10, .45, 2) = \boxed{.9004}$$

*→ want 3 to 10*

*do opposite of 0, 1, 2*

*↑  
calc does 0+1+2 ... we subtract from 1 & we have 3 to 10*