Ch 4.2 *Mean* and *Standard Deviation* for probability distribution tables

Mean or ***expected value*** (mu): $\mu = \Sigma(x \cdot p(x)$

Ex 1a) Find the Mean for the following table that represents the number of boys a couple could have, if they have 3 children.

x = # boys	p(x)
0	1/8
1	3/8
2	3/8
3	1/8

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Ex 2b) Find the mean number of heads you get when flipping a coin 4 times.

x = # heads	p(x)
0	1/16
1	4/16
2	6/16
3	4/16
4	1/16

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Try #1. Find the mean number of questions you'd get correct for 5 T/F questions?

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variance (row): $\sigma^2 = \Sigma[x^2 \cdot p(x)] - \mu^2$

Standard deviation (row): $\sigma = \sqrt{\Sigma[x^2 \cdot p(x)] - \mu^2}$

Ex2)

Lets go back to example 1a and 1b and find what the standard deviations are.

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Ex3) Range Rule of Thumb:

Maximum value: $\mu + 2\sigma$

Minimum value: $\mu - 2\sigma$

Ex3a) In 14 births the $\mu = 6.993$ and $\sigma = 1.2$, what would the min and max # of girls be?

Ex3b) Would it be unusual for there to be only 1 girl in the birth of 14?

P(x or more events)

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When betting on events, there is an average or ***expected value*** that you can make when playing the game or on the event.

Ex4a) Your class is selling 500 tickets for a $1/each and the winner wins $250. What is the expected value if you play?

outcomes	x	P(x)
win	$249	1/500
lose	-$1	499/500

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Ex4b) Gary pays **$500** for the year for a **million dollar** life insurance policy. The probability of Gary **dying** for a 40 year old man is **.005**. What is the expected value for Gary?

outcomes	x	p(x)
live	-$500	.995
die	$999,500	.005

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Ex4c) You are playing Roulette at the casino. You place a $5 bet on 13. If you win, you get $175. There are a total of 38 numbers. What is the expected value of winning.

outcomes	x	p(x)
win	$170	1/38
lose	-$5	37/38

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