Probability Review

- Fundamental Counting Principle

Olive Garden has a never ending pasta deal. They offer 4 types of pasta, 3 sauces, and 3 proteins. How many choices do you have of one pasta, one sauce, and one protein?

$4 \times 3 \times 3 = 36$

- Permutations
- Combinations

- Distinct arrangements

How many distinct ways can the letters CHASKA be arranged?

$\frac{6!}{2!}$ A-2 360

- Probability

A box contains 25 pieces of chocolate. If 13 are caramel filled and 12 are nougat what is the probability that you choose 3 caramel and 2 nougat?

$$\frac{{}_{13}C_3 \cdot {}_{12}C_2}{{}_{25}C_5} = \frac{18876}{53130} \quad 35.5\%$$

A pair of dice is rolled. Find the probability that the sum is

a) even or greater than 10

$\frac{20}{36} = \frac{5}{9}$

b) odd and prime

$\frac{14}{36} = \frac{7}{18}$

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

Given a standard deck of cards, what is the probability of picking

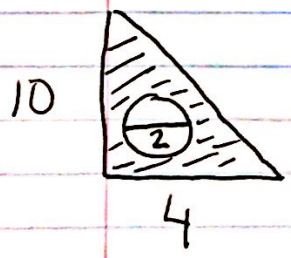
a) a black king

$\frac{2}{52} = \frac{1}{26}$

b) red face card

$\frac{6}{52} = \frac{3}{26}$

Find the probability that a point chosen at random falls within the shaded region.



$A_T = \frac{1}{2}bh$
$= \frac{1}{2}(4)(10)$
$= 20$

$A_C = \pi r^2$
$= \pi(1)^2$
$= \pi$

$P(\text{circle}) = \frac{\pi}{20}$
$= 15.7\%$

$P(\text{shaded}) = 100 - 15.7$
$= 84.3\%$

- Expected Value

On a multiple choice test a student is given 3 possible answers. The student receives 3pts for a correct answer and loses a point for an incorrect answer.

- What is the expected score on one question?

$$3\left(\frac{1}{3}\right) - 1\left(\frac{2}{3}\right) = \frac{1}{3}$$

- A construction company wants to submit a bid for remodeling the school. The research and planning needed to make the bid costs $4000. If the bid were accepted the company would make $24,000. Would you advise the company to spend the $4,000 if the bid only had a 20% chance of being accepted.

$$.2(26{,}000) - .8(4{,}000) = \$2000$$

Put in a bid