10.1-10.3 Review
Algebra II

1. In a photography exhibit, 6 photographs will be displayed in a row along one wall.

a. How many different ways can the photographs be displayed?

$6! = 720$ ways

b. How many different ways can 3 of the photographs receive first prize, second prize, and honorable mention?

${}_6P_3 = 120$ ways

2. You want to make a fruit smoothie using 3 of the fruits listed below. How many different smoothies can you make?

orange, strawberry, banana, pineapple, kiwi, watermelon, cantaloupe, peach

${}_8C_3 = 56$ smoothies

3. Five people walk into a movie theater and look for empty seats in which to sit. What is the number of ways the people can be seated if there are 8 empty seats?

${}_8P_5 = 6720$ ways

4. You must take 18 elective courses to meet your graduation requirements for college. There are 30 courses that you are interested in. How many different course selections are possible?

${}_{30}C_{18} = 86,493,225$ selections

5. A password consists of 3 letters and 2 digits. Which password is more secure, one in which letters and digits can be reused or one in which they cannot be reused?

Reused: $26 \cdot 26 \cdot 26 \cdot 10 \cdot 10 = 1,757,600$

not Reused $26 \cdot 25 \cdot 24 \cdot 10 \cdot 9 = 1,404,000$

when you can reuse..

6. How many distinguishable arrangements of the letters in the word TENNESSEE exist?

9 letters

4 E's, 2 N's, & 2 S's

$$\frac{9!}{4!2!2!} = 3,780$$

7. Use Pascal's triangle to expand $(3x + 2)^3$

$(3x+2)^3$ ← 3rd Row: 1 3 3 1

$= (3x)^3 + 3(3x)^2(2) + 3(3x)(2)^2 + 2^3$

$= \boxed{27x^3 + 54x^2 + 36x + 8}$

8. Use Pascal's triangle to expand $(2x-5)^4$ ← 1 4 6 4 1

$= (2x)^4 + 4(2x)^3(-5) + 6(2x)^2(-5)^2 + 4(2x)(-5)^3 + (-5)^4$

$= \boxed{16x^4 - 160x^3 + 600x^2 - 1000x + 625}$

9. A card is randomly drawn from a standard deck of 52 cards. Find the probability of drawing the given card.

a. the queen of hearts

$P(\heartsuit Q) = \frac{1}{52}$

b. an ace

$P(A) = \frac{4}{52} = \frac{1}{13}$

c. a diamond

$P(\diamondsuit) = \frac{13}{52} = \frac{1}{4}$

d. a red card

$P(\text{Red}) = \frac{26}{52} = \frac{1}{2}$

e. a card other than a 10

$P(\text{not } 10) = \frac{48}{52} = \frac{12}{13}$

f. the 6 of clubs

$P(6\clubsuit) = \frac{1}{52}$