

Unit 4 Review

1. Find each value.

a.  $P(6, 2)$

30

b.  $P(7, 5)$

2520

c.  $C(8, 3)$

56

d.  $C(5, 4)$

5

2. The letters  $r, s, t, u,$  and  $v$  are to be used to form five-letter patterns. How many patterns can be formed if repetitions are not allowed?

$\underline{5} \underline{4} \underline{3} \underline{2} \underline{1} = 5! = 120$  patterns  
OR  ${}_5P_5 = 120$

3. Five people have applied for three different positions in a store. If each person is qualified for each position, in how many ways can the positions be filled?

${}_5P_3$  OR  $5 \cdot 4 \cdot 3 = 60$  ways

4. How many ways can 7 people be seated at a round table relative to each other?

$(7-1)! = 720$  ways

5. How many baseball teams can be formed from 15 players if 3 only pitch and the others play any of the remaining 8 positions?

$\overset{\text{pitcher}}{\underline{3}} \underbrace{\underline{12} \underline{11} \underline{10} \underline{9} \underline{8} \underline{7} \underline{6} \underline{5}}_{\text{other positions}} = \cancel{59,875,200} \overset{{}_3C_1 \cdot {}_{12}C_8}{=} 1485$  teams

6. Three identical door prizes are to be given to three lucky people in a crowd of 100. In how many ways can this be done?

$\underline{100} \underline{99} \underline{98}$        $100P_3 = \cancel{979,200} \text{ ways}$

7. How many 4-digit numbers

a. Contain no 0's?

$\underline{9} \underline{9} \underline{9} \underline{9} = 6561$

b. Contain no 1's?

can't be 0 or 1

$\underline{8} \underline{9} \underline{9} \underline{9} = 5832$

c. Begin with an even digit and end with an odd digit?

$\underline{4} \underline{10} \underline{10} \underline{5} = 2000$

d. Contain at least one 4?

$\underline{9} \underline{10} \underline{10} \underline{10} - \underline{8} \underline{9} \underline{9} \underline{9} = 3168$   
(all 4-digit)      - (no 4's)

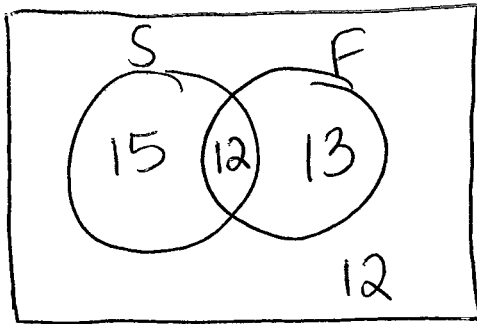
8. A bag contains 4 red and 6 white marbles. How many ways can 5 marbles be selected if exactly 2 must be red?

(must be 3 white then)

$$4C_2 \cdot 6C_3 = 120$$

$$6 \cdot 20 = 120$$

9. Of the 52 teachers at Roosevelt HS, 27 said they like to go sailing, 25 said they like to go fishing, and 12 said they don't enjoy either recreational activity. How many enjoy fishing but not sailing? Illustrate this with a Venn diagram to answer the question.



$$52 - 12 = 40$$

$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

$$40 = 27 + 25 - x$$

$$-52 \quad -52$$

$$-12 = -x$$

$$x = 12$$

13 enjoy fishing but not sailing

10. In the expansion of  $(x + y)^{20}$ , what is the coefficient of:

a.  $x^{17}y^3$

$$20C_3 = 1140$$

b.  $x^3y^{17}$

$$20C_{17} = 1140$$

c.  $x^{12}y^8$

$$20C_8 = 125,970$$

11. Write out the simplified expansion of  $(x - y)^5$  using Pascal's Triangle or Binomial Theorem.

$$5C_0(x)^5(-y)^0 + 5C_1(x)^4(-y)^1 + 5C_2(x)^3(-y)^2 + 5C_3(x)^2(-y)^3 + 5C_4(x)^1(-y)^4 + 5C_5(x)^0(-y)^5$$

~~scribble~~

$$1x^5 + -5x^4y + 10x^3y^2 - 10x^2y^3 + 5xy^4 - 1y^5$$