

Solve.

1. A golfer has 12 golf balls in his bag. In how many different orders can he use the balls during the course of his game if he only needs to use 4 of them?

$${}_{12}P_4 = \frac{12!}{(12-4)!} = 12 \cdot 11 \cdot 10 \cdot 9 = \boxed{11,880}$$

2. Twenty people interviewed for a job. Three of them will get called back for a second interview. How many ways can they choose three out of the twenty?

$${}_{20}C_3 = \frac{20!}{3!(20-3)!} = \frac{20 \cdot 19 \cdot 18}{3 \cdot 2 \cdot 1} = \boxed{1140}$$

3. In how many ways can five cards be chosen from a standard deck of cards?

$${}_{52}C_5 = \frac{52!}{5!(52-5)!} = \frac{52 \cdot 51 \cdot 50 \cdot 49 \cdot 48}{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = \boxed{2,598,960}$$

4. Marvin is on vacation. He has ten places he would like to visit, but he knows he will only be able to visit four in one day. How many different routes can he plan his day to visit four of the ten places?

$${}_{10}P_4 = \frac{10!}{(10-4)!} = 10 \cdot 9 \cdot 8 \cdot 7 = \boxed{5040}$$

5. How many ways can you arrange the letters A, B, C, D, E, and F?

$${}_6P_6 = 6! = 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = \boxed{720}$$

6. How many different orders can three students be put in a row of seats from a class of 25 students?

$${}_{25}P_3 = \frac{25!}{(25-3)!} = 25 \cdot 24 \cdot 23 = \boxed{13,800}$$

7. To play the lottery, you choose 6 different numbers from between 1 and 56. How many combinations of 6 numbers can you choose?

$${}_{56}C_6 = \frac{56!}{6!(56-6)!} = \frac{56 \cdot 55 \cdot 54 \cdot 53 \cdot 52 \cdot 51}{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = \boxed{32,468,436}$$

8. You have six movies recorded that you want to watch. In how many different orders can you choose to watch them?

$${}_6P_6 = 6! = \boxed{720}$$

9. How many unique ways can the letters in the word SNEEZES be arranged?

$$\frac{7!}{2!3!} = \boxed{420}$$

Evaluate.

10. ${}_{13}P_4 = \boxed{17,160}$

11. ${}_{10}C_3 = \boxed{120}$

12. $\frac{7!}{4!} = \boxed{210}$

Solve.

13. Given set $A = \{1, 2, 3, 4, 5\}$ and set $B = \{4, 5, 6\}$, find:

- a) $A \cap B$ $\{4, 5\}$
b) $A \cup B$ $\{1, 2, 3, 4, 5, 6\}$

14. Given set $A = \{\text{tall people}\}$, and set $B = \{\text{men}\}$, find:

- a) $A \cap B$ $\{\text{tall men}\}$
b) $\sim B$ $\{\text{women}\}$

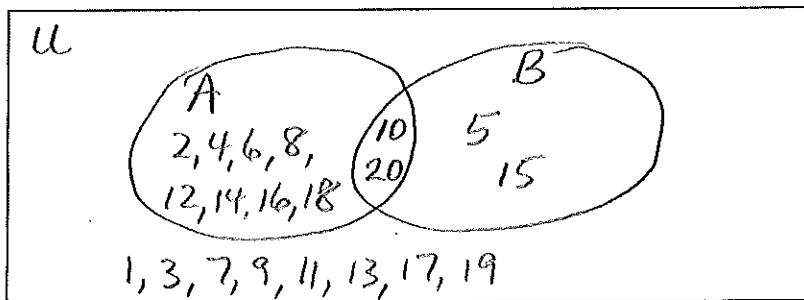
15. Given universal set $U = \{\text{standard deck of cards}\}$, set $A = \{\text{spades}\}$, and set $B = \{\text{face cards}\}$, find:

- a) $\sim A$ $\{\text{clubs, hearts, diamonds}\}$
b) $A \cap B$ $\{\text{jack of spades, queen of spades, king of spades}\}$

16. Given the following sets:

$U = \{\text{whole numbers 1 through 20}\}$, $A = \{\text{multiples of 2}\}$, $B = \{\text{multiples of 5}\}$

a) Draw a Venn diagram to represent the sets.



- b) Find $\sim A \cap B$ $\{5, 15\}$
c) Find $A \cup B$. $\{2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 5, 15\}$