

1. Refer to the spinner shown

a. What is the probability that the spinner stops on an even number?

$\frac{4}{9}$ (4, 6, 8, 24)

b. What is the probability that the spinner stops on a number greater than 8?

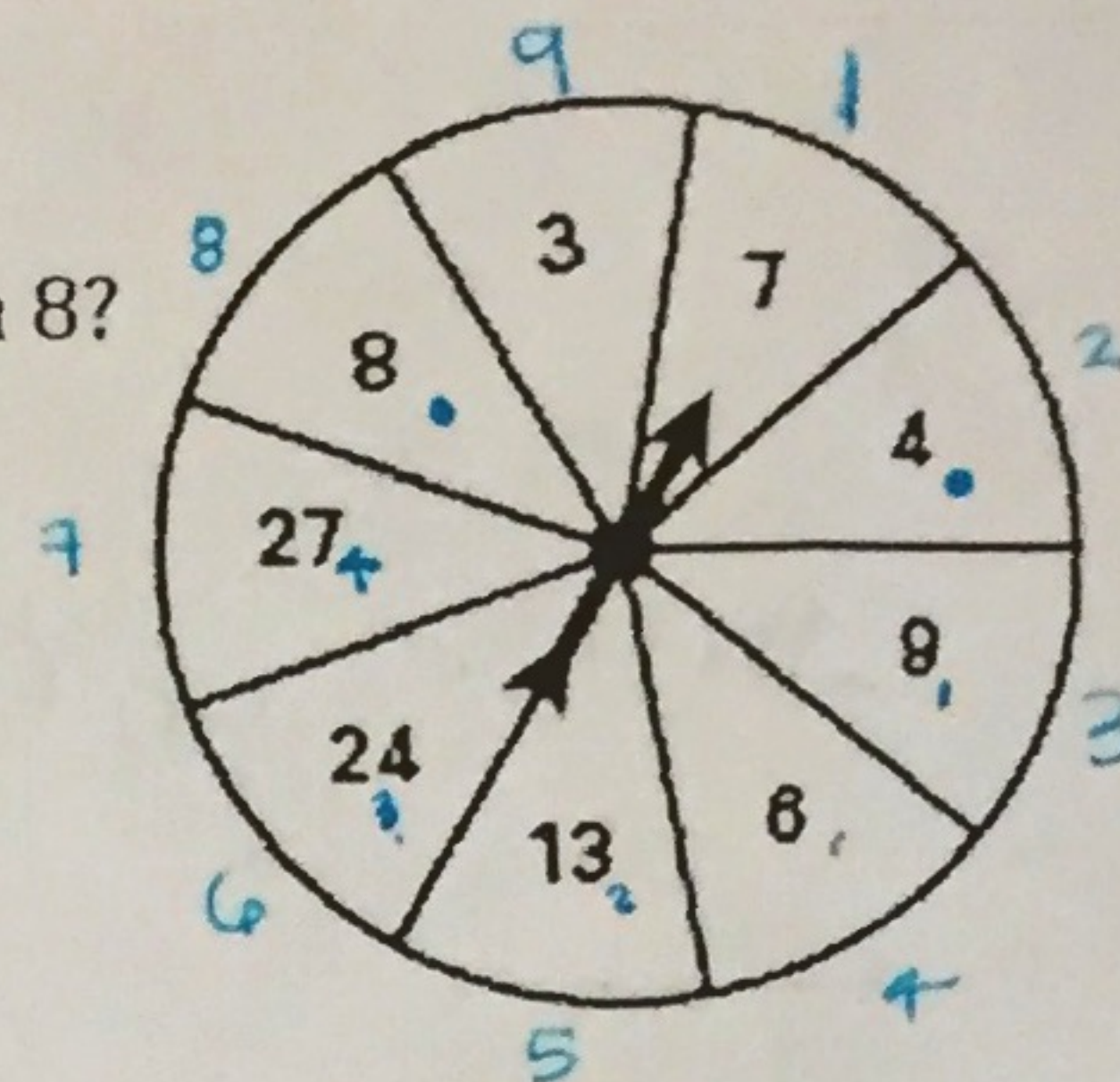
$\frac{4}{9}$ (9, 13, 24, 27)

c. What are the odds in favor of stopping on a multiple of 4?

want: 3 [4, 8, 24]
 don't want: 6 <don't simplify>

d. What are the odds against stopping on a multiple of 6?

don't want: 7 [6, 24]
 want: 2 <don't simplify>



not total!

2. A survey asked a total of 180 students in your school about their favorite spectator sports. The table shows the results of the survey.

Sport	Basketball	Soccer	Football	Baseball	Volleyball	Wrestling	Hockey
Number of students	40	20	45	20	16	18	21

a. What is the probability that a randomly selected student who participated in this survey chose football as his or her favorite spectator sport?

$\frac{45}{180} = \frac{1}{4}$

b. What is the probability that a randomly selected student who participated in this survey chose wrestling or hockey as his or her favorite spectator sport?

$\frac{18}{180} + \frac{21}{180} = \frac{39}{180} = \frac{13}{60}$

c. What are the odds in favor of a randomly selected student who participated in this survey choosing basketball as his or her favorite spectator sport?

want: 40
 don't want: 140 <don't simplify>

3. Find the number of ways you can arrange the letters.

a. all the letters from TACK

$4 \cdot 3 \cdot 2 \cdot 1 = 4! = 24$ ways

b. two letters from GAMER 5 letters

$5 \cdot 4 = 20$ ways

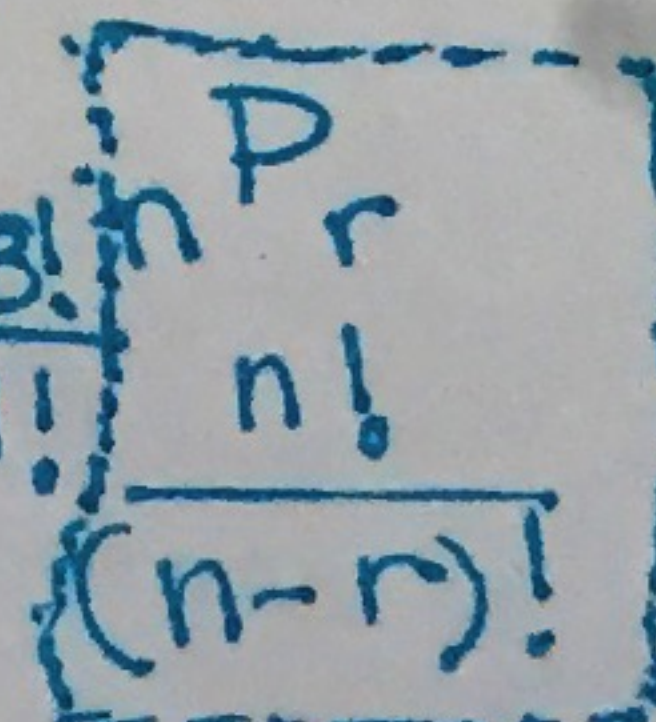
4. Evaluate the expression.

a. ${}_6P_3 = \frac{6!}{(6-3)!} = \frac{6!}{3!} = \frac{720}{6} = 120$

b. ${}_4P_4 = \frac{4!}{(4-4)!} = \frac{4!}{0!} = \frac{24}{1} = 24$

c. ${}_{15}P_3 = \frac{15!}{(15-3)!} = \frac{15!}{12!} = 15 \cdot 14 \cdot 13 = 2730$

d. ${}_8P_7 = \frac{8!}{(8-7)!} = \frac{8!}{1!} = 40320$



5. At the beginning of the summer you have 6 books to read. In how many orders can you read the books?

$6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 6! = 720$ ways

6. Evaluate the expression.

a. ${}^8C_4 = \frac{8!}{(8-4)!4!} = \frac{8!}{4!4!}$ b. ${}^5C_5 = \frac{5!}{(5-5)!5!} = \frac{5!}{5!} = 1$ c. ${}^7C_1 = \frac{7!}{(7-1)!1!} = \frac{7!}{6!} = 7$ d. ${}^{10}C_3 = \frac{10!}{(10-3)!3!}$ $\frac{nCr}{n! / ((n-r)!r!)}$

7. Tell whether the question can be answered using *combinations* or *permutations*. Then, answer the question.

a. Five students from the 90 students in your class will be selected to count the ballots for the vote for class president. In how many ways can the 5 students be selected? No order
combi. ${}^{90}C_5 = \frac{90!}{85!5!} = 43,949,268 \text{ ways}$

b. Twenty students are running for 3 different positions on student council. In how many ways can the 3 positions be filled? *perm.*
 ${}^{20}P_3 = \frac{20!}{(20-3)!} = \frac{20!}{17!} = 6,840 \text{ ways}$

c. To complete a quiz, you must answer 3 questions from a list of 6 questions. In how many ways can you complete the quiz? *combi.* No order
 ${}^6C_3 = \frac{6!}{3!3!} = 20 \text{ ways}$

8. A greeting card company packages 4 different cards together that are randomly selected from 10 different cards with a different animal on each card. What is the probability that one of the cards in a package is the card that has a dog on it? order doesn't matter so combi.
 $\frac{\text{want}}{\text{total}} = \frac{{}^9C_3}{{}^{10}C_4} = \frac{84}{210} = \frac{2}{5}$

9. You draw a card from a bag that contains 4 red cards numbered 1-4 and 5 blue cards numbered 1-5.

a. Find the probability of choosing a blue card or a card with an odd number. *counted 2xs: B1 B3 B5*
 $\frac{5}{9} + \frac{5}{9} - \frac{3}{9} = \frac{7}{9}$

b. Find the probability of choosing a card with an even number.
 $\frac{4}{9}$

c. Find the probability of choosing a red card or a number 5 card.
 $\frac{4}{9} + \frac{1}{9} = \frac{5}{9}$

10. A bag contains 6 yellow balls and 5 green balls. You randomly draw one ball, replace it, and randomly draw a second ball. *total: 11*

a. Find the probability that the first ball is green and the second ball is green.
 $\frac{5}{11} \cdot \frac{5}{11} = \frac{25}{121}$

b. Find the probability that the first ball is yellow and the second ball is green.
 $\frac{6}{11} \cdot \frac{5}{11} = \frac{30}{121}$