Algebra 2 Name: _____

10-1-10.3 Review

* Remember: if the order of objects matters, it's a permutation. If the order of objects doesn't matter, it's a combination.

1. License plates in Italy consist of two letters, followed by three digits, followed by 2 letters.
   a. How many license plates can be made if the letters and digits can be repeated?

   $26 \cdot 26 \cdot 10 \cdot 10 \cdot 10 \cdot 26 \cdot 26 = 456{,}976{,}000$

   b. How many license plates can be made if the letters and digits cannot be repeated?

   $26\ 25\ 10\ 9\ 8\ 24\ 23 = 258{,}336{,}000$

2. How many 7-card hands can be made from a deck of 52 cards that contain:
   a. 4 spades and 3 hearts? $_{13}C_4 \cdot {}_{13}C_3 = 204{,}490$
   b. 2 kings? $_4C_2 \cdot {}_{48}C_5 = 10{,}273{,}824$
   c. all face cards? $_{12}C_7 = 792$

3. How many ways can 1st prize, 2nd prize, and 3 prize be awarded to a group of 20 people.

   $_{20}P_3 = 6840$

4. How many groups of 4 students can be made from a class of 40?

   $_{40}C_4 = 91390$

5. You have 3 extra tickets to a concert and 5 friends that want to go. You decide to write your friends' names on slips of paper and you will randomly select 3 of them. How many ways can you select the 3 friends to go with you to the concert.

   $_5C_3 = 10$

6. How many different committees of 3 people can be chosen to work on a special project from a group of 9 people?

   $_9C_3 = 84$

7. How many 2-topping pizzas can be made if there are 10 available toppings to choose from?

   $_{10}C_2 = 45$

8. 5. How many different four-letter passwords can be created for a software access if no letter can be used more than once?

   $26 \cdot 25 \cdot 24 \cdot 23 = 358\,800$

9. You are selecting an outfit from 2 pairs of pants, 4 shirts, and 2 pairs of shoes. How many different outfits are possible?

   $2 \cdot 4 \cdot 2 = 16$

10. 7 people are in a swim meet. If there are no ties, how many ways could the gold, silver, and bronze medals be awarded?

    $_7P_3 = 210$

11. A four-person committee is chosen at random from a group of 16 people. How many different committees are possible?

    $_{16}C_4 = 1{,}820$

12. How many ways can the letters of the word SCIENCE?

    $$\frac{7!}{2!2!} = 1{,}260$$

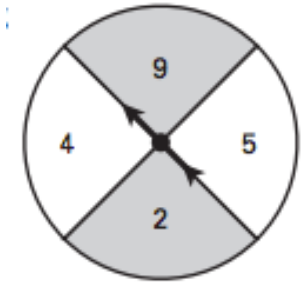
13. There are 8 finalists at a Quiz Bowl competition. The finalists must press a buzzer first in order to be eligible to answer a question.
    a. In how many different ways can the 8 finalists be seated at a table with 8 buzzers?

    $8! = 40{,}320$

    b. Suppose the table has 12 buzzers. In how many different ways can the 8 finalists be seated at the 12 buzzers?

    ${}_{12}P_8 = 19{,}958{,}400$

14. You have an equally likely chance of spinning any value on the spinner. Find the probability of spinning the given event.
    a. a shaded region $\frac{1}{2}$
    b. a factor of 21 $\frac{1}{4}$
    c. a number less than 6 or a shaded region 1
    d. an even number or perfect square $\frac{3}{4}$
    e. a prime number $\frac{1}{2}$
    f. a two-digit number 0



15. In order to choose a mascot for a new school, 2755 students were surveyed: 896 chose a falcon, 937 chose a ram, and 842 chose a panther. The remaining students did not vote. A student is chosen at random.
    a. What is the probability that the student's choice was a panther? ≈ 0.31
    b. What is the probability that the student's choice was not a ram? ≈ 0.66

16. You are dealt 5 cards. Find the probability that you receive:
    a. all red cards $\frac{{}_{26}C_5}{{}_{52}C_5} \approx 0.03$
    b. 2 sixes and 3 sevens $\frac{{}_4C_2 \cdot {}_4C_3}{{}_{52}C_5} \approx 9 \times 10^{-6}$ or 0.000009

17. Find the probability of choosing an E when selecting a letter from those in the word COLLEGE.

    $\frac{2}{7}$

18. Seven letters are chosen, one at a time, at random from those in the word ENGLISH.
    a. Find the probability that they will be chosen in alphabetical order. $\frac{1}{7!} \approx 2 \times 10^{-4}$ or 0.0002
    b. Find the probability that the first letter will be a vowel. $\frac{2}{7}$

19. Find the probability of randomly drawing the given card from a deck of cards:
    a. a club $\frac{1}{4}$
    b. an ace $\frac{1}{13}$
    c. a number less than 6 $\frac{4}{13}$

Expand:

20. $(3x-5)^4$
21. $(2y+4)^5$
22. $(4p-2r)^3$

20.) $81x^4 - 540x^3 + 1350x^2 - 1500x + 625$

21.) $32y^5 + 320y^4 + 1280y^3 + 2560y^2 + 2560y + 1024$

22.) $64p^3 - 96p^2r + 48pr^2 - 8r^3$