Practice #28 Alg 2 Monday, May 18 to Thursday, May 21 2019

SOLUTIONS

Find the number of outcomes for each problem. Show how you arrived at each answer.

1. You need a password for your new email account. The company requires your password to 7 characters long with the first 4 characters being a single digit from 0 to 9. The last three characters must be a letter. If numbers can be repeated but letters can't be repeated find the number of different passwords possible.

use MULT. COUNT. PRINC. (MCP)

$\underset{\#}{10} \cdot \underset{\#}{10} \cdot \underset{\#}{10} \cdot \underset{\#}{10} \cdot \underset{\text{letter}}{26} \cdot \underset{\text{letter}}{25} \cdot \underset{\text{letter}}{24}$

$= 156,000,000$ passwords are possible

2. Nine people entered a contest in which different prizes are awarded to each person. How many ways can all nine these prizes be awarded to the nine people?

* use either MCP or Factorial

$9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 9! = 362,880$ ways to award prizes

3. The local pizzeria offers a choice of 2 pizzas - supreme or vegetarian, 3 sides - chips, salad or coleslaw, and 4 drinks - juice, coke, ginger ale or water. For dinner I decide to have 1 pizza, 1 side, and 1 drink. How many possible meals do I have to choose from?

use MCP:

$\underset{\text{pizzas}}{2} \cdot \underset{\text{sides}}{3} \cdot \underset{\text{drinks}}{4} = 24$ different dinners of one of each

4. There are 6 people in a race. The following medals are awarded: 1st place: Gold 2nd place: Silver 3rd place: Bronze. How many ways can these three medals be awarded?

use MCP or Permutation (because order of finish is important)

$\underset{\text{1st}}{6} \cdot \underset{\text{2nd}}{5} \cdot \underset{\text{3rd}}{4}$ or $P_{6\ 3} = 120$ ways to award 1st, 2nd, and 3rd

5. At the car dealership there is room in the lot for 6 more cars. The dealer has 9 different cars to choose from to fill those spots. How many different ways can the dealer arrange 6 of these cars to fill those spots?

permutation

TOTAL cars = 9
arranging = 6 → $P_{9\ 6} = 60,480$ ways to arrange 6 of 9 cars

6. You have 8 trophies you've won over your years of competing. The shelf in your office has room for only 5 of these trophies. How many ways can you arrange 5 of your 8 trophies on this shelf?

permutation

TOTAL # trophies = 8
arranging = 5 → $P_{8\ 5} = 6720$ ways to arrange 5 of 8 trophies

7. There are 12 toppings at a salad bar. Your plate has room for only 7 of the toppings. How many 7 topping salads can be made?

Combination → when making a salad the order of ingredients IS NOT important

TOTAL # toppings = 12
toppings used = 7 → $_{12}C_7$ = 792 different 7 topping salads

8. There are 16 people in a race and the top three finishers will win the SAME prize, a $50 gift certificate. How many ways can these three gift certificates be awarded to the 16 racers?

Combination - since all prizes are the same it doesn't matter if you finish 1st, 2nd, or 3rd

TOTAL # runners = 16
winning a prize = 3 → $_{16}C_3$ = 560 3 people could win a prize

9. The final night of a Summer Festival will feature 3 different bands. There are 7 bands to choose from. How many different ways orders could 3 of these bands play in on the final night?

= permutation

TOTAL # Bands = 7
putting in order = 3 → $_7P_3$ = 210 # ways 3 bands could be ordered in a lineup for Final night

(or could use MCP → 7 · 6 · 5)

10. You want to frame a picture and hang it on the wall. At the frame shop there are the following to choose from: 12 different frame styles, 15 different background colors, and 5 different sizes. How many different pictures can you create?

use MCP: 12 (style) · 15 (Background Color) · 5 (size) = 900 different possible pictures

11. In a room there are 25 people waiting to see if they'll be selected for a jury. If a jury of 12 members must be selected from that jury pool. How many different juries are possible?

Combination: order when selected to be on a jury doesn't matter

TOTAL # prospective jurors = 25
Chosen to be on Jury = 12 → $_{25}C_{12}$ = 5,200,300 possible 12 person Juries