

Write each expression using factorials and then evaluate.

$$\underline{\quad 120 \quad} 1. \quad {}_{10}C_3 \quad \underline{\quad 95,040 \quad} 2. \quad {}_{12}P_5 \quad \underline{\quad 240 \quad} 3. \quad {}_7C_0 \quad {}_{10}C_9 \quad {}_4P_4$$

$\underline{\quad 9,765,625 \quad}$  4. Each question on a ten-question multiple-choice quiz has answer choices labeled A, B, C, D and E. How many different ways can a student answer the ten questions?

$\underline{\quad 102,515,625 \quad}$  5. How many different 3 letter, 4 digit license plates are there without a W and a 2?

$\underline{\quad 256 \quad}$  6. A coin is tossed eight times. How many possible sequences of heads or tails are possible?

$\underline{\quad 120,960 \quad}$  7. Six different hardcover books and four different paperbacks are placed on a shelf. How many ways can they be arranged if all the paperback books are together?

$\underline{\quad 40,320 \quad}$  8. In how many ways can 9 people sit around a campfire?

$\underline{\quad 181,440 \quad}$  9. In how many ways can 10 charms be placed on a bracelet with no clasp?

$\underline{\quad 30,240 \quad}$  10. Caid has 10 holiday candles, each a different color. How many ways can he arrange the candles in a candelabra that holds 5 candles?

$\underline{\quad 4,845 \quad}$  11. In how many ways can a student choose 4 books from 20 that are on the library shelf?

$\underline{\quad 124,740 \quad}$  12. How many committees of 5 men and 4 women can be selected from a group of 10 men and 12 women?

$\underline{\quad 588 \quad}$  13. From a group of 10 men and 8 women, how many committees of six contain at least 5 women?

$\underline{\quad 204,490 \quad}$  14. Seven cards are drawn from a standard deck of cards. How many hands consist of 4 hearts and 3 clubs?

$\underline{\quad 5,148 \quad}$  15. How many five card hands consist of the same suit?

$\underline{\quad 48,620 \quad}$  16. How many 9 player baseball teams can be made from a group of 18 players?

$\underline{\quad 3,360 \quad}$  17. How many different ways can the letters in "PARALLEL" be arranged?

$\underline{\quad 2,520 \quad}$  18. How many ways can seven keys be arranged on a key ring with a VIC card already on the ring?

$\underline{\quad 12 \quad}$  19. How many ways can 5 people be seated around a table if 2 of the people must be seated next to each other?

$\underline{\quad 22,308 \quad}$  20. Five cards are drawn from a standard deck of cards. How many hands consist of 2 diamonds and 3 spades?