

FST 10.1, 10.3, 10.5 Quiz Review

Name \_\_\_\_\_

1) Evaluate  ${}_{12}P_8$ . (Do you know how to use the formula?)

$$\frac{{}_n P_r}{r!} = \frac{{}_{12} P_8}{8!} = \frac{12 \cdot 11 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5}{8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = \frac{11880}{24} = \boxed{495}$$

2) At a luncheon, guests are offered a selection of 4 different grilled vegetables and 5 different relishes. In how many ways can 2 vegetables and 3 relishes be chosen?

$${}^4 C_2 \cdot {}^5 C_3 = 6 \cdot 10 = \boxed{60}$$

3) From a deck of 52 cards, 4 cards are drawn. What is the probability that all 4 cards are Aces?

$$\frac{{}^4 C_4}{{}^{52} C_4} = \frac{1}{270,725} = \boxed{3.69 \times 10^{-6}}$$

- or -

$$\frac{4}{52} \cdot \frac{3}{51} \cdot \frac{2}{50} \cdot \frac{1}{49} = \frac{24}{6,497,400} = \boxed{3.69 \times 10^{-6}}$$

4) A bag has 8 red marbles and 5 blue marbles. If 5 marbles are picked out, what is the probability that exactly 2 are red and 3 are blue?

$$8 + 5 = 13 \text{ total}$$

$$\frac{{}^8 C_2 \cdot {}^5 C_3}{{}^{13} C_5} = \frac{28 \cdot 10}{1287} = \frac{280}{1287} = \boxed{0.2176}$$

5) Expand  $(x+y)^7$ .

$$= {}^7C_0 x^7 y^0 + {}^7C_1 x^6 y^1 + {}^7C_2 x^5 y^2 + {}^7C_3 x^4 y^3 + {}^7C_4 x^3 y^4$$

$$+ {}^7C_5 x^2 y^5 + {}^7C_6 x^1 y^6 + {}^7C_7 x^0 y^7$$

$$= \boxed{1x^7 + 7x^6y + 21x^5y^2 + 35x^4y^3 + 35x^3y^4 + 21x^2y^5}$$

$$+ \boxed{7x^1y^6 + 1y^7}$$

6) Find the power of  $y$  and the coefficient of the  $x^3$  term in  $(x+y)^8$ .

$${}^8C_5 x^3 y^5 = \boxed{\underline{56} x^3 y^5}$$

7) Suppose that the probability of a cell phone that was manufactured in a certain factory being defected is 2%. What is the probability that 2 cell phones are defective in a shipment of 50 cellphones from this factory?

$$50C_2 (.02)^2 (.98)^{48} = \boxed{0.186}$$

8) A landscaping plan specifies that 10 trees of a certain type are to be planted in front of a building. When this type of tree is planted in the autumn, the probability that it will survive the winter is 85%. What is the probability that no fewer than 8 of the 10 trees will survive the winter if planted in the autumn?  $\rightarrow$  8, 9 or 10 survive

$$\begin{aligned} & \text{Survive: } 85\% \qquad \text{Not Survive: } 15\% \\ = & 10C_8 (.85)^8 (.15)^2 + 10C_9 (.85)^9 (.15)^1 + 10C_{10} (.85)^{10} (.15)^0 \\ = & 0.2757 + 0.3474 + 0.1769 \\ = & \boxed{0.8202} \end{aligned}$$