

Chapter 6 Test Review

Name _____

1) If A and B are two events in an experiment where $P(A) = 0.7$, and $P(A \cap B) = 0.2$, find the $P(B|A)$.

$$\frac{P(B \cap A)}{P(A)} = \frac{0.2}{0.7} = 0.286 = 28.6\%$$

2) A pair of fair 6-sided dice are tossed. Let $A = \{\text{the sum is } 5\}$ and $B = \{\text{1st die is a 3}\}$. $6 \cdot 6 = 36$

a) Find $P(B|A)$

$$\frac{P(B \cap A)}{P(A)} = \frac{\frac{1}{36} \cdot \frac{3}{4}}{\frac{4}{36}} = \frac{1}{4}$$

b) Find $P(A|B)$

$$\frac{P(A \cap B)}{P(B)} = \frac{\frac{1}{36} \cdot \frac{3}{6}}{\frac{6}{36}} = \frac{1}{6}$$

A	B
(1,4)	(3,1)
(2,3)	(3,2)
(3,2)	(3,3)
(4,1)	(3,4)
	(3,5)
	(3,6)

3) How many different ways can 6 children be lined up for a picture?

$$6P_6 = 6! = 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = \boxed{720}$$

4) How many different ways can 6 children be lined up for a picture is the oldest has to be first and the youngest has to be last?

$$\underline{1} \quad \underline{4} \quad \underline{3} \quad \underline{2} \quad \underline{1} \quad \underline{1} = \boxed{24}$$

5) How many ways can 32 runners cross the finish line?

$$32P_{32} = 32! = \boxed{2.43 \times 10^{35}}$$

6) Use the letters in RANDOMIZES to answer the following:

a) How many permutations of the letters begin with an R and end with a S?

$$\underline{1} \quad \underline{8} \quad \underline{7} \quad \underline{6} \quad \underline{5} \quad \underline{4} \quad \underline{3} \quad \underline{2} \quad \underline{1} \quad \underline{1} = \boxed{40,320}$$

b) How many 5 letter permutations can be made?

$$10P_5 = \boxed{30,240}$$

c) How many 5 letter permutations can be made which contain no M or D?

$$8P_5 = \boxed{6,720}$$

7) A wrapping center has 10 different types of wrapping paper, 6 different colors of ribbons, 8 different colors of bows, and 12 different types of name tags. Using one of each, how many different ways can you wrap a gift?

$$10 \cdot 6 \cdot 8 \cdot 12 = \boxed{5760}$$

80% present

8) On any day of the school year, there is a 20% chance that one of your teachers will be gone, regardless of whether or not they were gone the previous day.

a) Find the probability of your teacher being present for 5 consecutive days.

$$(.8)(.8)(.8)(.8)(.8) = 0.32768$$

$$= 32.768\%$$

b) Find the probability of your teacher being gone for 5 consecutive days.

$$(.2)(.2)(.2)(.2)(.2) = 3.2 \times 10^{-4}$$

$$= 0.00032$$

$$= 0.032\%$$

9) A group of athletes were polled to take a closer look at the enrollment patterns for science classes.

	Football	Basketball	Soccer	Swimming	
Chemistry	15	20	18	13	66
Earth Science	20	17	12	8	57
Physical Science	12	8	8	7	35
	47	45	38	28	158

a) Fill in the column totals, row totals, and table total above.

b) What percent of soccer players are taking Earth Science? $\frac{12}{38} = 31.6\%$

c) What percent of students taking Chemistry play Basketball? $\frac{20}{66} = 30.3\%$

d) What percent of swimmers or football players are taking Physical Science? $\frac{12+7}{47+28} = \frac{19}{75} = 25.3\%$

10) A school's cheater detector detects cheaters with a 97% accuracy and non-cheaters with a 94% accuracy. The school estimates that 85% of students cheat.

a) Make a contingency table for this situation:

	Cheater 85%	Non-Cheater 15%
ID as a cheater	97%	6%
ID as non-cheater	3%	94%
Total	100%	100%

b) A false positive results when a non-cheater is identified as a cheater. Find the probability that a non-cheater is identified as a cheater.

$$P(\text{NC} | \text{ID as cheater}) = \frac{P(\text{NC} \cap \text{ID as cheater})}{P(\text{ID as cheater})} = \frac{(0.06)(.15)}{(0.06)(.15) + (.97)(.85)} = \frac{0.009}{0.009 + 0.8245}$$

$$= \frac{0.009}{0.8335} = 0.0108$$

$$= 1.08\%$$