

Name: _____

Math 102, Practice Test II - Brase 4th.

1. A thick coin is tossed and a **4-sided** die is rolled. For the coin, $P(\text{Head})=0.3$, $P(\text{Tail})=0.5$, $P(\text{side})=0.2$. For the die, each side is equally likely. One outcome is (H,1). List all outcomes, assign correct probabilities and answer the following:

$P(\text{Coin is H or die is odd}) = \underline{\hspace{2cm}}$; $P(\text{Die is 2 or die is odd}) = \underline{\hspace{2cm}}$;

$P(\text{Die is 2 or die is even}) = \underline{\hspace{2cm}}$; $P(\text{Die is not a three}) = \underline{\hspace{2cm}}$;

$P(\text{Coin is not a side}) = \underline{\hspace{2cm}}$; $P(\text{Coin is T and die is even}) = \underline{\hspace{2cm}}$.

Are the events "Die is even" and "Coin is T" mutually exclusive? $\underline{\hspace{2cm}}$
independent? $\underline{\hspace{2cm}}$.

2. The table below gives the number of cars and trucks in use by age in a certain area. A vehicle is chosen at random. Find the probability that it is
- a) A truck, given that it's a vehicle over 10 years old: $\underline{\hspace{2cm}}$.
- b) A vehicle no more than 10 years old: $\underline{\hspace{2cm}}$.
- c) What percent of all cars are between three and ten years old? $\underline{\hspace{2cm}}$.

	Car	Truck	Total
Under 3 Years	28	5	33
3-5 Years	25	10	35
6-10 Years	20	15	35
Over 10 Years	12	8	20
Total	85	38	123

3. A standard six-sided die is weighted so that the probability of a side occurring is proportional to the number of dots on that side. (If the probability of a ONE is X , the probability of a TWO is $2X$, the probability of a THREE is $3X$, etc.) Use the properties of a probability distribution to answer these questions:
- What is the value of X above? _____
 - What is the probability of a FOUR? _____
 - What is the probability of getting greater than THREE on one roll? _____
4. A birth control procedure is effective 80% of the times it is used. What is the probability that it is effective five times in a row?

5. A roofer uses a laser level to align shingles. Errors made by the level are normally distributed with a mean of 0 mm and a standard deviation of 1 mm. What is the probability that his next measurement is
- Exactly correct? _____
 - Within 1.5 mm too high? _____
 - Within 0.5 mm high or low? _____
 - More than 2 mm low? _____
6. A manufacturing process makes golf balls whose flight characteristics are such that a mechanical driver will drive them 200 yards on average. If the process is in control, the standard deviation of the distances is 9 yards. The company's regular practice is to take samples of size 36 from each batch of 100,000 and test them with the driver.
- What is the mean _____ and standard deviation _____ of the SAMPLING DISTRIBUTION?
 - What is the probability that the mean of one of these size $n=36$ samples will be between 198 and 202 yards? _____ Assume the process is in control.
7. The life of Brand Q flashlight batteries is normally distributed with mean $\mu=240$ hours and standard deviation $\sigma=14.2$ hours. Let x be the life of a randomly selected battery. Find
- $P(x > 220)$: _____
 - $P(215 \leq x \leq 245)$: _____
 - For how long should you guarantee these batteries if you want to insure that 90% of the batteries outlive the guarantee period? _____