

Name KEY

SLUNetID \_\_\_\_\_

**Probability Worksheet**

1. Luna is a very good student. The probability that she studies and passes her math test is  $17 / 20$ . If the probability that luna studies is  $15 / 16$ , find the probability that she passes her math test, given that she has studied.

$$P(S \text{ and } P) = \frac{17}{20}$$

$$P(S) = \frac{15}{16} .$$

$$P(P|S) = \frac{P(S \text{ and } P)}{P(S)} = \frac{\frac{17}{20}}{\frac{15}{16}} = .907$$

2. The probability that Jane smokes is  $3 / 10$ . The probability that she smokes and develops lung cancer is  $4 / 15$ . Find the probability that Jane develops lung cancer, given that she smokes.

$$P(S) = \frac{3}{10}$$

$$P(C \text{ and } S) = \frac{4}{15}$$

$$P(C|S) = \frac{\frac{4}{15}}{\frac{3}{10}} = .889$$

3. A penny and a nickel are tossed. Find the probability that the penny shows heads, given that the nickel shows heads.

$$\frac{1}{2}$$

4. A penny is tossed. Find the probability that it shows heads. Compare this answer to question 4, and explain the results.

$\frac{1}{2}$       the two events are  
independent

5. The spinner shown below is spun once. Find the probability that it points to an even number, given that it points to a shaded region:



$$P(E|S) = \frac{P(E \text{ and } S)}{P(S)}$$

$$= \frac{\frac{2}{8}}{\frac{4}{8}} = \frac{1}{2}$$

- six-sided
6. A die is tossed. Find  $P(\text{less than } 5 \mid \text{even})$ .

$$P(\text{less than } 5 \mid \text{even}) = \frac{P(\text{less than } 5 \text{ and even})}{P(\text{even})} = \frac{\frac{2}{6}}{\frac{3}{6}} = \frac{2}{3}$$

7. A number is selected at random from the set of numbers  $\{1, 2, 3, 4, 5, 6, 7, 8\}$ . Find:
- a.  $P(\text{odd})$

$$\frac{4}{8} = .5$$

- b.  $P(\text{prime} \mid \text{odd})$  Primes: 2, 3, 5, 7

$$P(\text{prime and odd}) = 3/8$$

$$P(\text{prime} \mid \text{odd}) = \frac{3/8}{4/8} = \frac{3}{4} = .75$$

8. A box contains three blue marbles, five red marbles, and four white marbles. If one marble is drawn at random, find:

a.  $P(\text{blue} \mid \text{not white}) = \frac{P(\text{blue and not white})}{P(\text{not white})}$

$$= \frac{3/12}{8/12} = \frac{3}{8}$$

- b.  $P(\text{not red} \mid \text{not white})$

$$\frac{P(\text{not red and not white})}{P(\text{not white})} = \frac{3}{8}$$