

Name: _____

Date: _____

Probability & Statistics: **Blizzard Bag #2**

Mod: _____

Directions: Use a pencil and read carefully.

Odds are used in gambling games to make them fair. For example, if you rolled a die and won every time you rolled a 6, then you would win on average once every 6 times. So that the game is fair, the odds of 5 to 1 are given. This means that if you bet \$1 and won, you could win \$5. On average, you would win \$5 once in 6 rolls and lose \$1 on the other 5 rolls – hence the term *fair game*.

In most gambling games, the odds given are not fair. For example, if the odds of winning are really 20 to 1, the house might offer 15 to 1 in order to make a profit.

Odds can be expressed as a fraction or as a ratio, such as $\frac{5}{1}$, 5 : 1, or 5 to 1. Odds are computed in favor of the event or against the event. The formulas for odds are:

$$\text{Odds in favor} = \frac{P(E)}{1-P(E)}$$

$$\text{Odds against} = \frac{P(\bar{E})}{1-P(\bar{E})}$$

In the die example: Odds in favor of a 6 = $\frac{\frac{1}{6}}{\frac{5}{6}} = \frac{1}{5}$ or 1 : 5

Odds against a 6 = $\frac{\frac{5}{6}}{\frac{1}{6}} = \frac{5}{1}$ or 5 : 1

Find the odds in favor of and against each event:

1. Rolling a die and getting a 2
2. Rolling a die and getting an even number
3. Drawing a card from a deck and getting a spade
4. Drawing a card and getting a red card
5. Drawing a card and getting a queen
6. Tossing two coins and getting two tails