

Notes 10.3
Probability

Probability of an Event:

$$\frac{\text{\# of outcomes in an event}}{\text{\# of total outcomes}}$$

Example 1: You roll a standard six-sided die.
Find the probability of:

a) rolling a 3

$$\frac{1}{6}$$

b) rolling an odd number

1, 3, 5

$$\frac{3}{6} = \frac{1}{2}$$

Example 2: You pick a card from a standard deck of cards. Find the probability of:

a) picking an 8

$$\frac{4}{52} = \frac{1}{13}$$

b) a red king

$$\frac{2}{52} = \frac{1}{26}$$

$$\frac{{}^2C_1}{{}^{52}C_1}$$

Example 3: There are 12 people on your gym class baseball team. Your teacher draws names one by one to determine the batting order.

- a) What is the probability that the students will bat in order for height (increasing or decreasing)?

$$\frac{2}{12!} = \frac{2}{12P_{12}}$$

$$\frac{2}{479,001,600}$$

$$\frac{1}{239,500,800}$$

- b) What is the probability that 2 of the 5 females on the team bat first?

$$\begin{array}{r} \underline{5 \quad 4} \quad | \quad 10 \quad 9 \quad 8 \quad 7 \quad 6 \quad 5 \quad 4 \quad 3 \quad 2 \quad 1 \\ 12 \quad 11 \quad | \quad 10 \quad 9 \quad 8 \quad 7 \quad 6 \quad 5 \quad 4 \quad 3 \quad 2 \quad 1 \end{array}$$

$$\frac{20}{132}$$

$$\frac{5P_2 \cdot 10P_{10}}{12P_{12}}$$

Experimental Probability:

Example 4: On a recent History exam, 7 students earned an A, 12 earned a B, 8 earned a C, 1 earned a D and 3 earned an F. What is the probability that a randomly chosen student in this history class received a C or better?

$$\frac{\text{C or B or A}}{\text{all}} = \frac{8 + 12 + 7}{31} = \frac{27}{31}$$

ODDS: in favor of event A : $\frac{\text{\# of outcomes in A}}{\text{\# of outcomes NOT in A}}$

Example 5: A marble is drawn from a bag containing 6 red, 12 yellow and 9 black marbles.

a) Find the odds in favor of drawing a red marble.

$$6 : 21 \rightarrow 2 : 7$$

$$\frac{6}{21} \quad \frac{2}{7}$$

b) Find the odds against drawing a black marble.

$$\frac{\text{NOT black}}{\text{black}}$$

$$\frac{18}{9} = \frac{2}{1}$$