

# 10.1 Day 2 (Monday 1/27)

Friday, January 24, 2020 12:29 PM

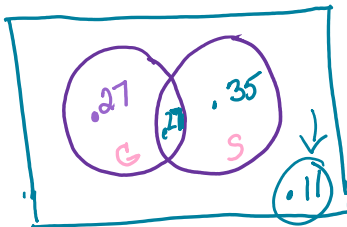
Precalculus H  
10.1 Day 2 – Probabilities

Name \_\_\_\_\_

Venn Diagram:

At Big Kid High School, 54% of the students are girls and 62% of the students play sports. Half of the girls at the school play sports.

a. Construct a Venn diagram



$$\begin{array}{r} 62 \\ - 27 \\ \hline \end{array}$$

b. What percentage of the students who play sports are boys?

$$\frac{\text{boys } .35}{\text{sports } .62} = 56.45\%$$

c. If a student is chosen at random, what is the probability that it is a boy who does not play sports?

11%

d. What is the probability that a student is a girl or plays sports?

$$.54 + .62 - .27 = .89$$

### Addition Principle of Probability

For events A and B in a sample space,  $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ .

Tree Diagrams:

1. Make a tree diagram based on the survey results to help you answer questions about probability.

- Of all the respondents, 17% are male.
- Of all the male respondents, 33% are left handed.
- Of all the female respondents, 90% are right handed.

a. Find P(a female respondent is left handed).

$$.10$$

b. Find P(a respondent is both male and right handed).

$$.17(.67) = .1139$$

2. A student in Buffalo, NY made the observations below.

Make a tree diagram to help you answer questions about probability.

- Of all snowfalls, 5% are heavy (at least 6 in.)
- After a heavy snowfall, schools are closed 67% of the time.
- After a light (less than 6 in.) snowfall, schools are closed 3% of the time.

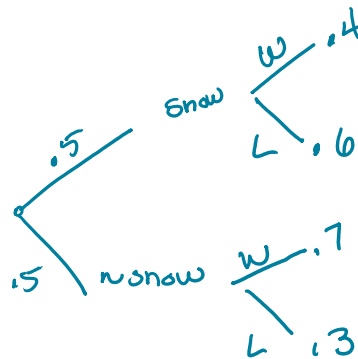
a. Find the probability that the snowfall is light and the schools are open.

$$0.95 (0.97) = .9215$$

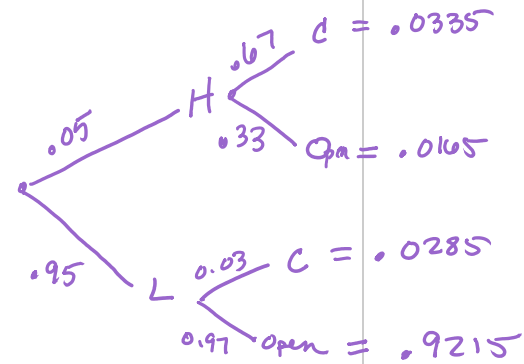
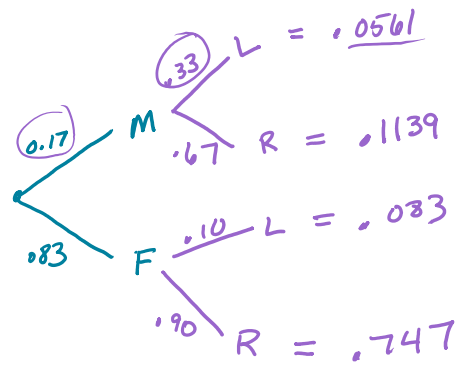
b. Find the probability that a school is open given a heavy snowfall.

$$0.33$$

3. A football team has a 70% chance of winning when it doesn't snow, but only a 40% chance of winning when it snows. Suppose there is a 50% chance of snow. Make a tree diagram to find the probability that the team will win.



$$.5(.4) + .5(.7) = .55$$



More probability:

You are dealt a 5 card hand from a standard 52 card deck:

P(exactly 3 spades)

$$\frac{13C_3 \cdot 39C_2}{52C_5}$$

P(all red or all black)

You draw a card or card(s) from a standard deck of cards:

P(you draw a 2 or a diamond)

$$\frac{4}{52} + \frac{13}{52} - \frac{1}{52} = \frac{16}{52} = \frac{4}{13}$$

P(you draw a 7 and then another 7)

$$\frac{4}{52} \cdot \frac{3}{51} = .0045$$

You are selecting a committee of 4 from 20 people, 15 girls and 5 boys:

P(all boys or all girls)

P(at least 1 girl)

● Something to think about:

You are picking three marbles from a bag, one at a time with replacement. You have a 72% chance for picking a blue marble and 28% chance for picking a green marble. What is the probability of picking exactly two of the same color?

BBG or BBG or GBB or GGB or GBG or BGG     .6048

$$3C_2 \left( .72 \cdot .72 \cdot .28 + .28 (.28) (.72) \right)$$