

22)

$$a) \frac{5}{\text{Trea}} \cdot \frac{4}{\text{May}} \cdot \frac{2}{\text{Att}} = 40$$

$$b) 6 \cdot 5 \cdot 3 = 90$$

$$6) a) {}_9C_5 = 126$$

$$b) \frac{{}^3M_2}{{}_2E} {}_4C_3 \cdot {}_5C_2 = 40$$

12) Philadelphia

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

$$2) \quad 6x^2 - 11x - 30 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2(a)}$$

$$x = \frac{11 \pm \sqrt{121 - 4(6)(-30)}}{2(6)}$$

$$x = \frac{11 \pm \sqrt{841}}{12}$$

$$x = \frac{11 \pm 29}{12}$$

$$\frac{40}{12} \quad \frac{-18}{12}$$

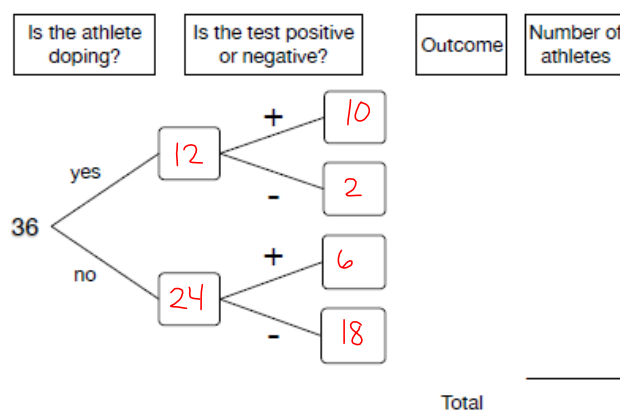
$$\left(\frac{10}{3}\right) \quad \left(-\frac{3}{2}\right)$$

$$7) \quad (x^{3/4} y^{1/6})^{12}$$

$$\left(\frac{3}{4}\right)\left(\frac{12}{1}\right) \quad \left(\frac{1}{6}\right)\left(\frac{12}{1}\right)$$

$$x^9 y^2$$

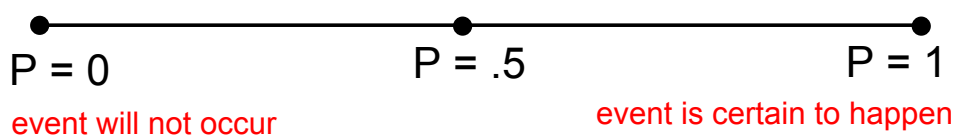
Complete the tree diagram and 2-way table below for your results for 36 athletes.



		Is the test positive or negative?		Total
		+ Yellow	Green	
Is the athlete doping?	Red Y	10	2	12
	Blue N	6	18	24
Total		16	20	36

Probability

ranges from 0 to 1



Theoretical probability

$$P(A) = \frac{\text{\# of outcomes in event A}}{\text{total \# of outcomes}}$$

Experimental probability

$$P_E(A) = \frac{\text{\# trials where event A occurs}}{\text{total \# of trials}}$$

6 sided die

Find the probability of rolling a 5.

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

Find the probability of rolling an even number.

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

A community center hosts a talent contest for local musicians. On a given evening, 7 musicians are scheduled to perform. The order in which the musicians perform is randomly selected during the show.

a) What is the probability that the musicians perform in alphabetical order by their last names? (Assume that no 2 musicians have the same last name)

$$\frac{1}{7!}$$

Pull

b) You are friends with 4 of the musicians. What is the probability that the first 2 performers are your friends?

$$\frac{{}^4C_2}{{}^7C_2} = \frac{2}{7} = .2857$$

Pull

You have an equally likely chance of choosing any integer from 1 through 20. Find the probability of the given event.

- a) A perfect square is chosen.

$$\frac{4}{20} = \frac{1}{5} = .2 = 20\%$$

1
4
9
16
25
36
49
...

- b) A factor of 30 is chosen.

1 · 30
2 · 15
3 · 10
5 · 6

$$\frac{7}{20} = .35 = 35\%$$

You pick a card from a standard deck of 52 playing cards. Find the probability of the given event.

- a) Picking an 8

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

- b) Picking a red king

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

Amanda used a standard deck of 52 cards and selected a card at random. She recorded the suit of the card she picked, and then replaced the card. The results are in the table below.

Diamonds	
Hearts	
Spades	
Clubs	

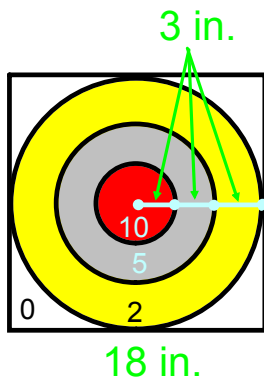
a) Based on her results, what is the experimental probability of selecting a heart? $\frac{9}{30} = \frac{3}{10} = .3$ 30%

b) What is the theoretical probability of selecting a heart? $\frac{1}{4} = 25\%$

c) Based on her results, what is the experimental probability of selecting a diamond or a spade? $\frac{18}{30} = \frac{3}{5}$ 60%

d) What is the theoretical probability of selecting a diamond or a spade? $\frac{1}{2}$ 50%

Geometric Probability



You throw a dart at the square board shown. Your dart is equally likely to hit any point inside the board. Are you more likely to get 10 points or 0 points?

$$\frac{\pi(3)^2}{18^2}$$

10 points
 $.087$
 8.7%

$$\frac{18^2 - \pi(9)^2}{18^2} = .215$$

0 points
 21.5%

Odds vs Probability

$$\text{Odds in favor of event A} = \frac{\text{\# of outcomes in A}}{\text{\# of outcomes not in A}}$$

winners
losers

$$\text{Odds against event A} = \frac{\text{\# of outcomes not in A}}{\text{\# of outcomes in A}}$$

losers
winners

A standard six sided die is rolled.

Pull

a) Find the odds in favor of rolling a 6.

Pull

b) Find the odds against rolling an odd number.

A card is drawn from a standard deck of 52 cards.

a) Find the odds in favor of drawing a 10.

b) Find the odds against drawing a club.

c) Find the odds in favor of drawing a heart.

d) Find the odds against drawing a queen.

Probability Worksheet 4
Experimental and Theoretical Probability

Name CABO

Per _____ Date _____

Amanda used a standard deck of 52 cards and selected a card at random. She recorded the suit of the card she picked, and then replaced the card. The results are in the table below.

Diamonds		7
Hearts		9
Spades		11
Clubs		3

30 total

1. Based on her results, what is the experimental probability of selecting a heart?

$$\frac{9}{30} = \frac{3}{10}$$

2. What is the theoretical probability of selecting a heart?

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

3. Based on her results, what is the experimental probability of selecting a diamond or a spade?

$$\frac{7}{30} + \frac{11}{30} = \frac{18}{30} = \frac{9}{15} = \frac{3}{5}$$

4. What is the theoretical probability of selecting a diamond or a spade?

$$\frac{13}{52} + \frac{13}{52} = \frac{26}{52} = \frac{1}{2}$$

5. Compare these results, and describe your findings.

Experimental and theoretical are not the same
but within 10% of each other.

6. Dale conducted a survey of the students in his classes to observe the distribution of eye color. The table shows the results of his survey.

Eye color	Blue	Brown	Green	Hazel
Number	12	58	2	8

80 total

- a. Find the experimental probability distribution for each eye color.

$$P(\text{blue}) = \frac{12}{80} = \frac{3}{20} \quad P(\text{brown}) = \frac{58}{80} = \frac{29}{40} \quad P(\text{green}) = \frac{2}{80} = \frac{1}{40} \quad P(\text{hazel}) = \frac{8}{80} = \frac{1}{10}$$

- b. Based on the survey, what is the experimental probability that a student in Dale's class has blue or green eyes? $\frac{12}{80} + \frac{2}{80} = \frac{14}{80} = \frac{7}{40}$

- c. Based on the survey, what is the experimental probability that a student in Dale's class does not have green or hazel eyes? $80 - 10 = \frac{70}{80} = \frac{7}{8}$

- d. If the distribution of eye color in Dale's grade is similar to the distribution in his classes, about how many of the 360 students in his grade would be expected to have brown eyes? $\frac{29}{360} = \frac{10,440}{360} = 261 \text{ students}$