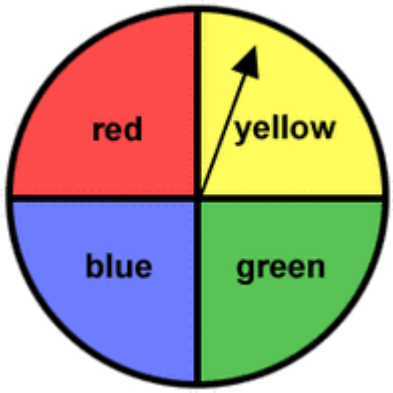
10.8, 13.1–13.2 Review Name:

PROBABILITY

13.1 : I can calculate experimental and theoretical probability.

Example 1: The spinner to the right is spun 40 times. The following table shows the color distribution.

RED	YELLOW	BLUE	GREEN
12	7	11	10



What is the *EXPERIMENTAL* probability that:

a) you spin a red? $\frac{12}{40} = \frac{3}{10}$

b) you spin a yellow? $\frac{7}{40}$

c) you spin a blue? $\frac{11}{40}$

c) you don't spin a green? $1 - P(g)$ $1 - \frac{10}{40} = \frac{30}{40} = \frac{3}{4}$

What is the *THEORETICAL* probability that:

a) you spin a red? $\frac{1}{4}$

b) you spin a yellow? $\frac{1}{4}$

c) you spin a blue? $\frac{1}{4}$

c) you don't spin green? $\frac{3}{4}$

Example 2: Dale conducted a survey of 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

$= 80$

a) Find the experimental probability distribution for each eye color.
P(blue) = $\frac{12}{80} = \frac{3}{20}$ P(brown) = $\frac{58}{80} = \frac{29}{40}$ P(green) = $\frac{2}{80} = \frac{1}{40}$ P(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?

$P(\text{blue or green}) = \frac{12+2}{80} = \frac{14}{80} = \frac{7}{40}$

c) Based on the survey, what is the experimental probability that a student in Dale's class does not have green or hazel eyes?

$1 - P(\text{green or hazel})$

$1 - \frac{10}{80} \Rightarrow \frac{80}{80} - \frac{10}{80} = \frac{70}{80} = \frac{7}{8}$

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?

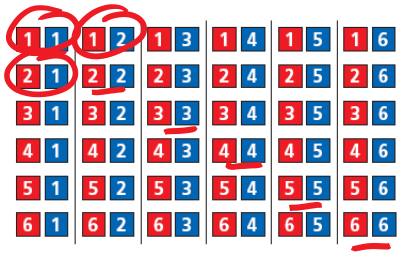
$P(\text{Brown}) = \frac{58}{80} = \frac{29}{40}$

$\frac{29}{40} = \frac{x}{360}$

$40x = 10440$

$x = 261$ people have brown eyes

Example 3: Two numbered cubes are rolled. The sample space is shown below. Find the following…



a) P(rolling two 5's)

$\frac{1}{36}$

b) P(the sum is less than 4)

$\frac{3}{36} = \frac{1}{12}$

b) P(the sum is greater than 12)

0 impossible

d) P(rolling the same number)

$\frac{6}{36} = \frac{1}{6}$

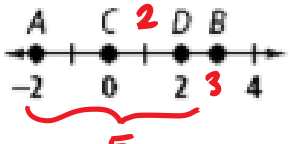
10.8 – Geometric Probability

Example 1: The cycle of the light on George Street at the intersection of George Street and Main Street is 10 seconds green, 5 seconds yellow, and 60 seconds red. If you reach the intersection at a random time, what is the probability that the light is red?

$\frac{60}{75} = \boxed{\frac{4}{5}}$ or .8 or 80%

Example 2: A point between A and B on each number line is chosen at random. What is the probability that the point is between C and D?

a)



5

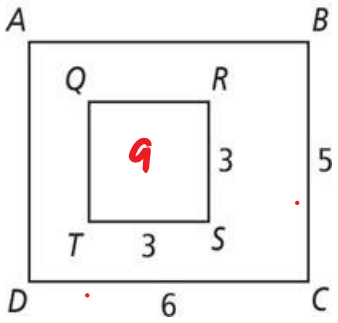
$\boxed{\frac{2}{5}}$

B)

9

$\frac{3}{9} = \boxed{\frac{1}{3}}$

Example 3: Point P in rectangle $ABCD$ is chosen at random.



a) Find the probability that P is in square $QRST$.

$P(\text{square}) = \frac{A\square}{A_{total}} = \frac{9}{30} = \boxed{\frac{3}{10}}$

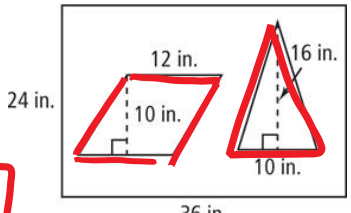
b) Find the probability that P is *not* in square $QRST$.

$1 - P(\text{square})$

$1 - \frac{3}{10} = \boxed{\frac{7}{10}}$

Example 4: If a dart lands at random on the poster at the right, what is the…

a) probability that the dart will land inside one the polygons?



$A_{par} = bh = 12 \cdot 10 = 120$

$A_{\triangle} = \frac{bh}{2} = \frac{10 \cdot 16}{2} = 80$

$P(\triangle \& \square) = \frac{120 + 80}{36 \cdot 24}$

$\frac{200}{864} = \boxed{\frac{25}{108}}$ or 23.15%

b) probability that the dart will land outside of the two polygons?

$1 - \frac{25}{108} = \frac{83}{108}$ or $\frac{864 - (120+80)}{864}$

13.2 – Frequency Tables

Example 1: A student records the type of weather each day for 21 consecutive days. The results are shown in the table below.

Weather Type	Number of days
Sunny	12
Rainy	4
Cloudy with no rain	5

total = 21

Find the relative frequency of each type of weather.

a) Sunny $\frac{12}{21}$ b) Rainy $\frac{4}{21}$ c) Cloudy with no rain $\frac{5}{21}$

Example 2: A student randomly chooses marbles from a bag containing 3 blue marbles and 3 red marbles. He chooses two at a time, and repeats this 10 times. The results are shown in the frequency table below.

Colors	BB	BR	RR	RB
Frequency	2	3	1	4

= 10

If 2 marbles are randomly chosen, what is the probability of choosing *exactly*

a. one red marble? 7/10 or 70%

b. two blue marbles? 2/10 = 1/5 or 20%

Example 3: A student records the favorite sport for 17 students. The results are shown in the table at the right.

a. What is the relative frequency of soccer as a favorite sport?

RF(soccer) = $\frac{8}{17}$

b. What is the relative frequency of basketball as a favorite sport?

RF(basketball) = 4/17

Sport	Number of Responses
Soccer	8
Baseball	5
Basketball	4

total = 17

Example 4: A student chooses socks randomly, one at a time, from his drawer. Out of 20 different times, he chooses 6 black socks, 3 blue socks, and 11 white socks. What is the probability of choosing a blue sock?

P(blue) = $\frac{3}{20}$