Six students are to be selected for a debate. In the cla
are 9 girls and 8 boys. Find the number of ways of
these six members

a) [   ]

b) [   ]

Outcomes, Probability, and Statistics

Theoretical Probability

$$= \frac{\text{\# of favorable outcomes}}{\text{Total possible outcomes}}$$

Total # possible outcomes is often referred to as the

Sample Space

Experimental Probability

$$= \frac{\text{\# times an event occurs}}{\text{Total \# of trials}}$$

550 people were asked about their favorite fruit.
The results are shown in the table.

You can use this data to predict the probability of a certain answer when asking another person about their favorite fruit.

	Apple	Pear	Orange	Banana	Total
Male	73	64	80	51	268
Female	68	75	83	56	282
Total	141	139	163	107	550

Experimental Probability
Sample Size = 550

Find each probability as a fraction without reducing.

1. P(pear)   # favorable outcomes are all those who chose Pear in the survey.

$$P(pear) = \frac{139}{550}$$

	Apple	Pear	Orange	Banana	Total
Male	73	64	80	51	268
Female	68	75	83	56	282
Total	141	139	163	107	550

2. P(banana or orange)

favorable outcomes are all those who chose banana or orange or Both in the survey.

who chose banana = 107   Nothing will be counted twice.

who chose orange = 163

who chose both = 0   # favorable outcomes = 107 + 163 = 270

$$P(banana\ or\ orange) = \frac{270}{550}$$

	Apple	Pear	Orange	Banana	Total
Male	73	64	80	51	268
Female	68	75	83	56	282
Total	141	139	163	107	550

3. P(female and pear)

favorable outcomes are all those who are BOTH a female AND chose pear in the survey.

who are in BOTH the Female row AND the Pear column = 75

favorable outcomes = 75

$$P(female\ and\ pear) = \frac{75}{550}$$

	Apple	Pear	Orange	Banana	Total
Male	73	64	80	51	268
Female	68	75	83	56	282
Total	141	139	163	107	550

4. P(male or apple)

favorable outcomes are all those who are male or chose apple or are Both in the survey.

who are male = 268   73 people will be counted twice.

who chose apple = 141

who that are both = 73   # favorable outcomes = 268 + 141 - 73 = 336

$$P(male\ or\ apple) = \frac{336}{550}$$

Panel 1 (top-left):

	Apple	Pear	Orange	Banana	Total
Male	73	64	80	51	268
Female	68	75	83	56	282
Total	141	139	163	107	550

5. If 75 more people are surveyed approximately how many of them will pick Banana as their favorite?

Start by finding the number of people on the survey who picked Banana = 107

Next, find the following probabilty: $P(Banana) = \dfrac{107}{550}$

<u>Now you have a couple of choices on how to finish:</u>

One method: Turn this probability into a percent: 107/550 = 0.195 = 19.5% then apply this percent to the next 75 people:

19.5% of 75 = (0.195)(75) = 14.6 or about 15 people.

Panel 2 (top-right):

Second Method: Create a Proportion using the probabilty.

$$\dfrac{107}{550} = \dfrac{x}{75}$$

Now Cross-Multiply to get 14.6 or about 15 people.

Panel 3 (bottom-left):

188 people were asked about their favorite season. The results are shown in the table.

	Spring	Summer	Fall	Winter	Total
Child	20	32	16	23	91
Adult	24	38	29	6	97
Total	44	70	45	29	188

Find each probability as a fraction without reducing.

Sample Size = 188

1. P(Fall)   # favorable outcomes are all those who chose Fall in the survey.

$P(Fall) = \dfrac{45}{188}$

Panel 4 (bottom-right):

	Spring	Summer	Fall	Winter	Total
Child	20	32	16	23	91
Adult	24	38	29	6	97
Total	44	70	45	29	188

2. P(Adult or Spring)

favorable outcomes are all those who are Adult or chose Spring or are Both in the survey.

who are Adult = 97

who chose Spring = 44

who that are both = 24

24 people will be counted twice.

favorable outcomes = 97 + 44 - 24 = 117

$P(Adult \ or \ Spring) = \dfrac{117}{188}$

Panel 1:

	Spring	Summer	Fall	Winter	Total
Child	20	32	16	23	91
Adult	24	38	29	6	97
Total	44	70	45	29	188

3. P(Child and Winter)

favorable outcomes are all those who are **BOTH** a Child AND chose Winter in the survey.

who are in **BOTH** the Child row AND the Winter column = 23

favorable outcomes = 23

$$P(\text{Chile and Winter}) = \boxed{\frac{23}{188}}$$

Panel 2:

	Spring	Summer	Fall	Winter	Total
Child	20	32	16	23	91
Adult	24	38	29	6	97
Total	44	70	45	29	188

4. P(Summer or Spring)

favorable outcomes are all those who chose Summer or Spring or Both in the survey.

who chose Summer = 70

who chose Spring = 44

who chose both = 0

Nothing will be counted twice.

favorable outcomes = 70 + 44 = 114

$$P(\text{Summer or Spring}) = \boxed{\frac{114}{188}}$$

Panel 3:

	Spring	Summer	Fall	Winter	Total
Child	20	32	16	23	91
Adult	24	38	29	6	97
Total	44	70	45	29	188

5. Another group of people were asked the same question and 50 people said Winter. How many people were in that group?

As we saw before there are several ways to answer a question like this.

Proportion Method:

<u>Find Probability</u>:

$$P(\text{Winter}) = \frac{29}{188}$$

<u>Set up Proportion</u>:

$$\frac{29}{188} = \frac{50}{x}$$

Answer = 324.14   approximately 324 people were in the group

Panel 4:

You can continue working on Practice #29.

We'll continue this material tomorrow.

Practice #29 is still to be due on Saturday, May 30 by 10:00 pm.