

The difference between OR and AND

NAME:

When studying probability, we may want to find the probability that event A *and* event B occur at the same time, or the probability that event A *or* event B occurs. We'll need to make some distinctions between OR and AND.

We'll use AND if we mean both events will occur at the same time.

We'll use OR if we mean either one, or the other, or both events will occur. Let's look at some examples.

The probabilities on this worksheet can be figured simply by calculating

$$\text{Probability of an event} = \frac{\text{number of successes}}{\text{number of total possibilities}}$$

1a.) Consider rolling a six-sided die and tossing a coin. Here, the outcomes would be in the form 1H or 5T where H stands for "heads" and T stands for "tails" while the number is the die result. Those are two of the possible outcomes; write down the *entire* sample space with curly set brackets and commas.

1b.) What is the probability of rolling an even number AND tossing a heads? Write down the successes from the sample space.

1c.) What is the probability of rolling an even number OR tossing a heads? Write down the successes from the sample space.

2. We asked a fictitious sample, “Which pet would you prefer, a dog, a cat, or a rat?” The following two-way table displays our results. Answer the following questions.

	Men	Women	Total
Prefers Cats	30	46	
Prefers Dogs	42	35	
Prefers Rats	5	7	
Total			

a.) Fill in the missing totals, including the cell in the bottom right of the table. What does the number in this bottom-right cell tell us?

b.) If we select a person from this sample randomly, what is the probability that the person will be a woman? Round to the nearest hundredths.

c.) If we select a person from this sample randomly, what is the probability that the person will be a man who prefers cats? Round to the nearest hundredths. Is this the event “man AND prefers cats” or “man OR prefers cats” (circle one)?

d.) If we select a person from this sample randomly, what is the probability that the person will be a woman or someone who prefers rats? Round to the nearest hundredths. Is this the event “woman AND prefers rats” or “woman OR prefers rats” (circle one)?