## **Probability and At least One**

We want to perform multiple selection experiments and compute probabilities that involve the phrase **at least one**. To do this, we will need to use the Complement Rule for Probability.

 $P(E) + P(\overline{E}) = 1$  which is equivalent to  $P(\overline{E}) = 1 - P(E)$ 

# $P(at \ least \ one \ \Delta) = 1 - P(none \ \Delta)$

### **Bag of Marbles**



If you select two different marbles, what's the probability of selecting:

- 1. At least one red marble?
- 2. At least one green marble?

If you select two marbles with replacement, what's the probability of selecting:

3. At least one red marble?

4. At least one green marble?

### Standard Deck Assume the Ace is High

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If you select three **different** cards at random, what's the probability:

- 5. At least one is an Ace?
- 6. At least one is a face card?
- 7. At least one Diamond?

If you select three cards at random with replacement, what's the probability:

8. At least one is an Ace?

9. At least one is a face card?

10. At least one Diamond?

### COVID-19



Covid-19	Test +	Test -	Total
Infected	15	18	33
Not Infected	105	362	467
Total	120	380	500

If you select two **different** people at random, what's the probability:

11. At least one is infected?

12. At least one tests +?

#### **Eight Question Multiple Choice Quiz**

There is an eight question multiple choice quiz in which each question has 5 possible answers (a,b,c,d,e).

13. If you guess on each question, what's the probability of getting at least one answer correct?

#### **Eight Question True/False Quiz**

There is an eight-question true/false quiz in which each question has 2 possible answers (true or false).

14. If you guess on each question, what's the probability of getting at least one answer, correct?

#### **Defective Calculators**

A very large bin contains 500 calculators that are either defective or non-defective. It is believed that 25 of the calculators are defective.

15. If a teacher decides to buy 6 different calculators, what is the probability at least one calculator is defective?