

Name: KEY

Date: \_\_\_\_\_

### Probability Part 1 – Assignment

**Each answer must be given as a fraction in lowest terms, a decimal, & percent!**

1) You shuffle a deck and turn over a card. What is the probability that:

a) the card is an ACE? b) the card is red? c) it's a face card? d) it's not a heart?

$$\frac{4}{52} = \frac{1}{13} = 0.077 = 7.7\% \quad \frac{26}{52} = \frac{1}{2} = 0.5 = 50\% \quad \frac{12}{52} = \frac{3}{13} = 0.23 = 23\% \quad \frac{39}{52} = \frac{3}{4} = 0.75 = 75\%$$

e) For 26 trials, you shuffle the entire deck and turn one card over. You get an ACE 3 times. Does this equal your theoretical probability from Part a? Why or why not?

$$\frac{3}{26} = 0.115 = 11.5\%$$

*No, as it is an experimental probability, which will get closer to the theoretical probability as more and more trials are done*

2) In a five team tournament, what is the probability that Team C wins?  $\frac{1}{5} = 0.2 = 20\%$

3) Suppose you roll a six-sided die, and then a four-sided die. What is the probability that: *\*Hint: you may want to build a tree diagram.*

a) You roll a 1 OR 6 and then roll a 3?

$$P(1 \text{ or } 6 \text{ AND } 3) = \frac{2}{24} = \frac{1}{12} = 0.08\bar{3} = 8.\bar{3}\%$$

b) Your roll totals to 7?

$$P(\text{total of } 7) = \frac{4}{24} = \frac{1}{6} = 0.1\bar{6} = 16.\bar{6}\%$$

4) You roll two dice at the same time. What is the probability that:

*\*Hint: A tree diagram may be helpful*

a) You roll a 3 and a 2?

$$P(3 \text{ and } 2) = \frac{2}{36} = \frac{1}{18} = 0.0\bar{5} = 5.\bar{5}\%$$

b) Your total is equal to 7?

$$P(\text{total of } 7) = \frac{6}{36} = \frac{1}{6} = 0.1\bar{6} = 16.\bar{6}\%$$

c) You get 'doubles'?

$$P(\text{doubles}) = \frac{6}{36} = \frac{1}{6} = 0.1\bar{6} = 16.\bar{6}\%$$

5) You have two standard decks of cards. You flip one card from each deck. What is the probability of:

a) You flip two JACKS?

$$P(2 \text{ jacks}) = \frac{16}{2704} = \frac{1}{169} = 0.0059 = 0.59\%$$

$$\frac{4}{52} \times \frac{4}{52} = \frac{16}{2704}$$

same as

$$\frac{1}{13} \times \frac{1}{13} = \frac{1}{169}$$

b) You flip a 10 first, and then a SPADE?

$$P(10 \text{ then SPADE}) = \frac{52}{2704} = \frac{1}{52} = 0.019 = 1.9\%$$

$$\frac{4}{52} \times \frac{13}{52} = \frac{52}{2704}$$

same as

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

c) You flip a RED face card and then a SPADE?

$$P(\text{Red FC then SPADE}) = \frac{78}{2704} = \frac{3}{104} = 0.0288 = 2.88\%$$

$$\frac{6}{52} \times \frac{13}{52} = \frac{78}{2704}$$

$$\frac{3}{26} \times \frac{1}{4} = \frac{3}{104}$$

6) You have a standard deck of cards. What is the probability of flipping three consecutive numbers in order from smallest to largest?

For example, you flip a 3, then 4, then 5. Or a 10, then JACK, then QUEEN, or a KING, then ACE, then 2, etc.

1<sup>st</sup> card can be anything, so this doesn't affect the probability.

2<sup>nd</sup> card can only be 4 cards in 51

3<sup>rd</sup> card can only be 4 cards in 50

so 16 chances out of 2550 (visualize tree diagram)

$$P(3 \text{ consec in order from small to large}) = \frac{16}{2550} = \frac{8}{1275} = 0.00627 = 0.627\%$$