Probability Worksheet #4
September 28, 2018
2 Points

Circle one name.

Name: _Solutions_   Name: _____ Name: _____

1. A special deck of cards has five suits (red, yellow, green, black, purple), each with ranks 1 through 9.

   (a) How many cards are in this deck?

   (b) Suppose we draw a card at random. Let R be the event that the card is red. Let E be the event that the card we draw has rank 8. Find the following probabilities (leave your answer as fractions; no need to simplify). Also, express these using the appropriate probability notation.

      i. The probability the card is red:

      $$P(R) = \frac{9}{45} = \frac{1}{5}$$

      You do not need to reduce your answers; $\frac{9}{45}$ is both allowed and preferred as an answer.

      ii. The probability the card is not an 8:

      $$P(\bar{E}) = \frac{40}{45} = \frac{8}{9}$$

      iii. The probability the card is a red 8:

      ~~RED 8~~ $P(R \cap E) = \frac{1}{45}$

      iv. The probability that the card is either red or an 8 (or both):

      $$P(R \cup E)$$

      v. The probability that the card is a non-red 8:

      $$P(\bar{R} \cap E)$$

      vi. The probability that the card is either red or is not an 8 (or both).

      $$P(R \cup \bar{E})$$

2. A number is chosen at random from the interval $[2, 15]$, with all numbers being equally likely. For each of the following combinations of intervals, determine the probability that the chosen number is in the indicated set.

(a) $[4, 10] \cup [8, 12]$ $\quad \frac{12-4}{15-2} = \frac{8}{13}$

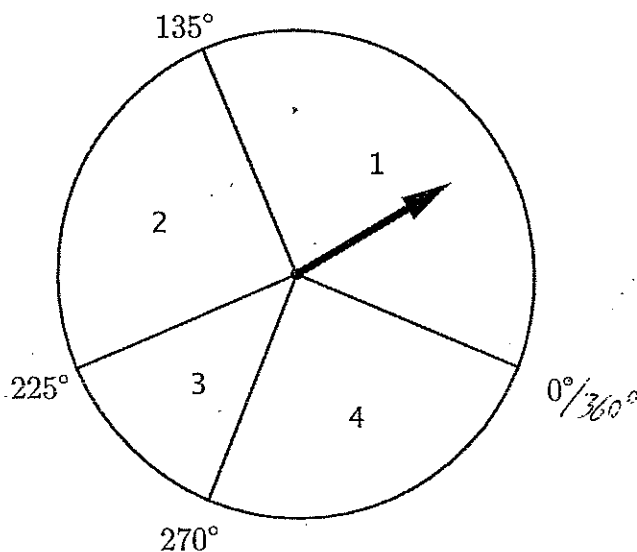(b) $[4, 10] \cap [8, 12]$ $\quad \frac{10-8}{15-2} = \frac{2}{13}$

(c) $[4, 8] \cup [2, 12]$ $\quad \frac{12-2}{15-2} = \frac{10}{13}$

(d) $[4, 8] \cap [2, 12]$ $\quad \frac{8-4}{15-2} = \frac{4}{13}$

(e) $[4, 8] \cap [10, 12]$ $\quad \frac{0}{13} \rightarrow$ no overlap, so no chance of landing in the intersection

(f) $[4, 8] \cup [10, 12]$ $\quad \frac{(8-4)+(12-10)}{15-2} = \frac{4+2}{13} = \frac{6}{13} \rightarrow$ do not include $[8,10]$ since neither set exists there.

3. Pictured here is an unusual spinner for a game.

135°

1

2

225°   3

4

0°/360°

270°

Assuming all positions are equally likely, what is the probability that your spin will land on

(a) 3? $\quad \frac{270° - 225°}{360°} = \frac{45}{360} \rightarrow \frac{1}{8}$

Again, no need to simplify. (You will not be marked off if you correctly simplify, though.)

(b) An even number?

$$\frac{(225-135)+(360-270)}{360} = \frac{90+90}{360} = \frac{180}{360} \rightarrow \frac{1}{2}$$