Math 153 - Quiz 5
February 28, 2019

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (3 points) In a probability experiment, a letter is selected at random from the word *zenzizenzizenzic.*

   (a) What is the sample space?

   $\{z, e, n, i, c\}$

   (b) What is the event of selecting a vowel?

   $\{e, i\}$

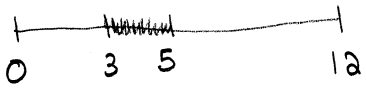
   (c) What is the probability of selecting a vowel or the letter z?

   $$P(\{e, i, z\}) = \frac{\#\text{ OF } e, i, z}{\#\text{ OF LETTERS}} = \boxed{\frac{12}{16}}$$

2. (1 point) Suppose A is an event with probability 0.76. Determine $P(A')$.

   $$P(A') = P(\bar{A}) = 1 - P(A) = 1 - 0.76 = \boxed{0.24}$$

3. (1 point) A point is selected at random along a 1-ft ruler. What is the probability that the point is between the 3 and 5 inch marks?



$$\frac{5-3}{12-0} = \boxed{\frac{2}{12}}$$

TAKE-HOME PORTION OF QUIZ 5. DUE TUESDAY.

4. (2 points) Suppose A and B are events with $P(A) = 0.35$ and $P(B') = 0.75$.

   (a) Find $P(A \cup B)$ if A and B are exclusive (disjoint). $P(\bar{B}) = 0.75 \Rightarrow P(B) = 0.25$

$$P(A \cup B) = P(A) + P(B) =$$

$$0.35 + 0.25 = \boxed{0.60}$$

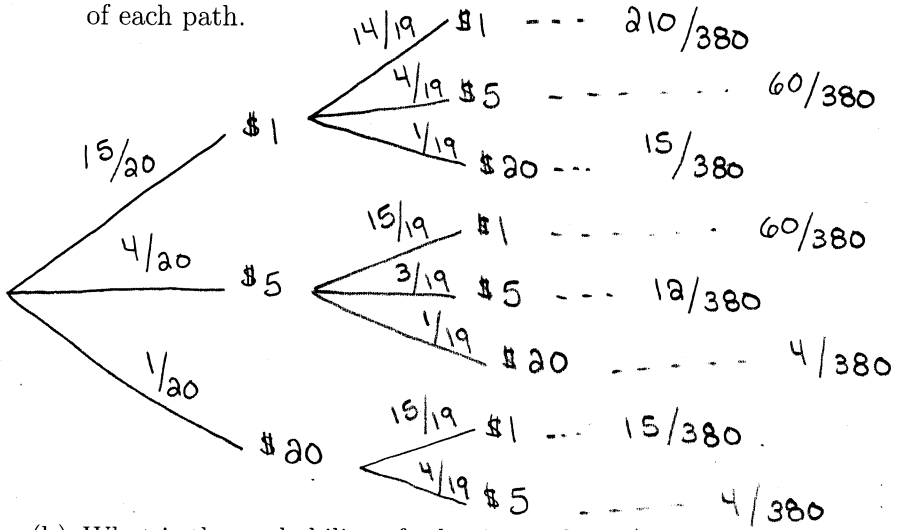
   (b) Find $P(A \cap B)$ if $P(A \cup B) = 0.48$.

$$P(A \cap B) = 0.35 + 0.25 - 0.48$$

$$= \boxed{0.12}$$

5. (3 points) An envelope contains fifteen 1-dollar bills, four 5-dollar bills and one 20-dollar bill. Two bills are selected at random.

   (a) Sketch the complete tree diagram for this experiment. Include the probabilities of each path.



   (b) What is the probability of selecting at least \$20?

$$\{\$21, \$25\}$$

$$\underbrace{\frac{15}{380} + \frac{15}{380}}_{\$21} + \underbrace{\frac{4}{380} + \frac{4}{380}}_{\$25} = \boxed{\frac{38}{380} = 10\%}$$