ST 516 - Homework 12
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2. (2 points) Consider the rolling of a fair, six-sided die.

(a) Why do we consider this to be random?

Because there is an equal probability for each of the possible outcomes

(b) Identify the outcomes.

The set 1:6 or 1, 2, 3, 4, 5, and 6

(c) Identify two possible events.

A 2 and a 3.

(d) Identify the probability associated with each outcome. Why did you choose these particular probabilities?

The probability of a 2 is 1/6 and the probability of a 3 is 1/6 since the are independent. I choose these probabilities because the problem states the die is fair and the events are independent.

(e) Define one random variable that may be associated with the rolling of the die.

One random variable could be x given the value of 5 if the result is even and -5 if the result is odd.

(f) If we were able to roll the die infinitely many times, what would happen to the relative frequencies of each outcome? What is the name of this phenomenon?

The relative frequency for each result would converge upon 1/6 for a fair die which is uniform distribution. The name of this phenomenon is the Law of Large Numbers.

3. (2 points) There are five candy choices for sale at a local candy shop: Twix, KitKat, Snickers, Skittles and 3 Musketeers. For a random customer, the probabilities of choosing each candy bar are represented by the bar chart shown here:

Probabilities of a Loyal Customer Selecting Candy Bars on Special
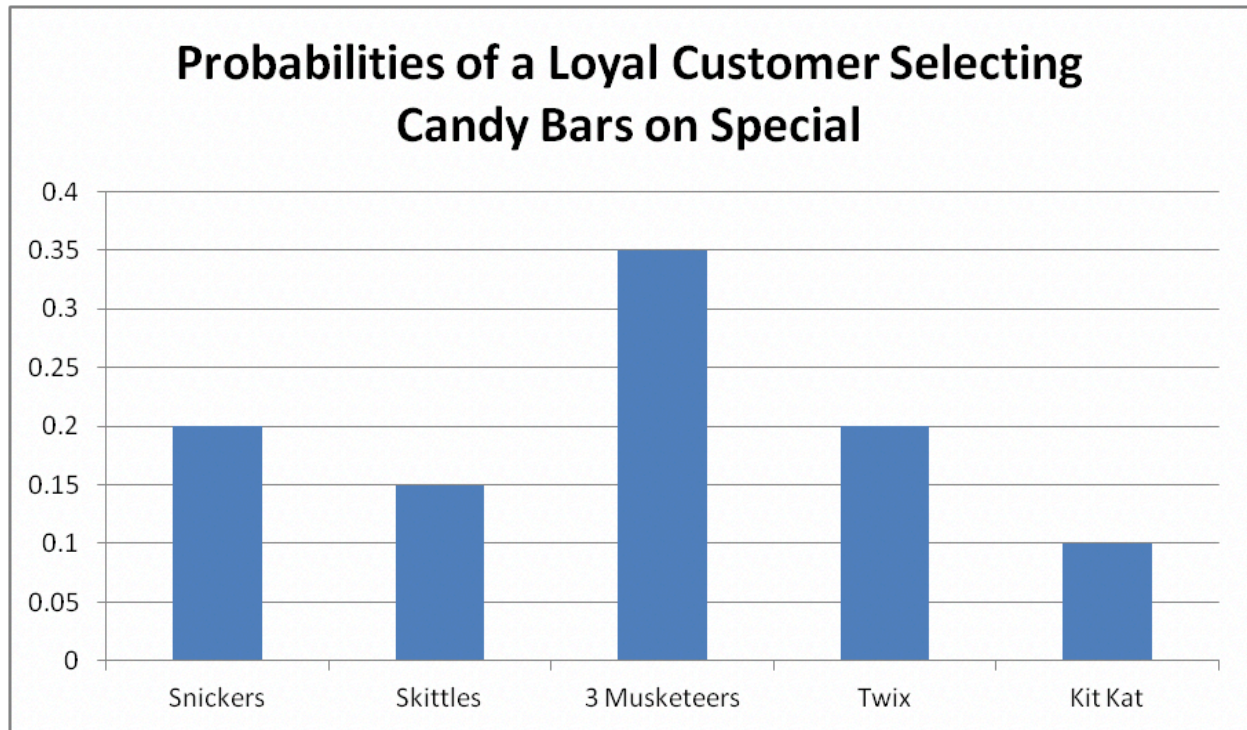
. (a) What is the probability that the customer will buy a Twix or KitKat?

P(Twix or KitKat) = 0.2 + 0.1 = 0.3

What is the probability that the customer will buy Snickers, Skittles or 3 Musketeers?

P(Snickers or Skittles or 3M) = 0.2 + 0.15 + 0.35 = 0.7

What is the probability that this customer will not buy any candy?

A Zero since

P(total) = P(snickers) + P(Skittles) + P(3M) + P(Twix) + P(KK)

= 0.2 + 0.15 + 0.35 + 0.2 + 0.1 = 1.0

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. (b) Let X be a random variable representing the candy bought—you should assign the candy choice outcomes to the integers 1 through 5 in the same order as on the bar chart (left to right). Write the probability distribution of X in tabular format.

X	Probability
1	0.2
2	0.15
3	0.35
4	0.2
5	0.1