Density Curves

Reading

- Section 2.5

Practice Problems

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Notes

- The book refers to them as "continuous probability functions".
- Think of them like "smooth histograms".
- Used to describe large (infinite) populations.
- Key property:

  Area under the curve and between v_1, v_2 is equal to the percent of data values that are between v_1 and v_2.
  Total area under curve equals 1 (100%).

- To really compute things we would need to know the equation of this curve, and do some Calculus.
- Distributions have *parameters* that specify their exact shape.
- Some examples of distributions that are easy to work with:

  Uniform Straight line from a to b. Represents the idea that all numbers between a and b are equally likely. For example most computers are equipped with "random number generators" that produce uniformly random numbers between 0 and 1.

  Normal Has well known formula and tables to use. We will see this in next section. Plays a dominant role in statistics because of the "Central Limit Theorem" we will discuss later.

Uniform Distribution

- Graph is a straight line at height $\frac{1}{b-a}$, extending from $x = a$ and $x = b$.
- Can compute areas as they are just rectangles.

  Shape Symmetric
  Mean $\frac{a+b}{2}$

Median $\frac{a+b}{2}$
Std Dev $\sqrt{\frac{(b-a)^2}{12}}$
Quartiles One fourth and three fourths of the way from a to b.
IQR $\frac{b-a}{2}$

Example: Consider the uniform distribution from $a = 1$ to $b = 3$.

- Draw the graph.
- Compute using the graph the amount of data between $x = 1.2$ and $x = 2.9$.
- Find using the graph the location of the 90th percentile.
- Compute the mean, standard deviation, and IQR.