

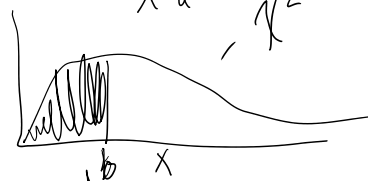
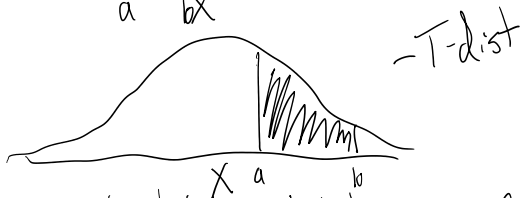
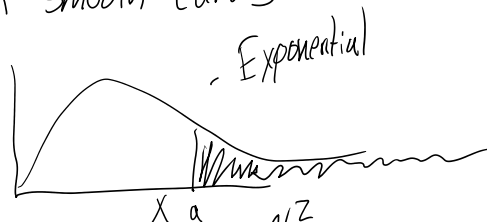
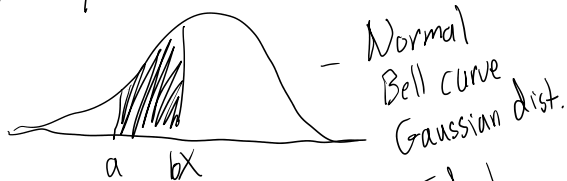
# Probability with Continuous Variables

Continuous variable is a variable that can take any value in a range  $\mathbb{R} \leftarrow$  Real number line.

Normal Dist

We represent continuous variables with smooth curves

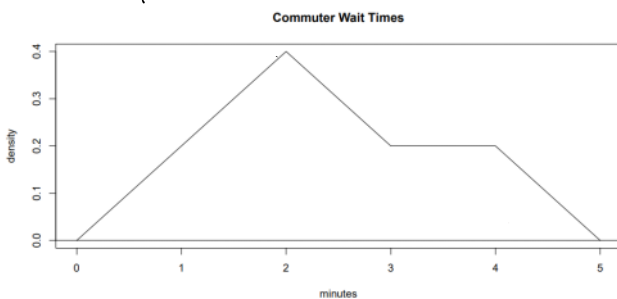
$$\frac{1}{\sqrt{2\pi}} \exp\left(-\frac{(x-\mu)^2}{2}\right)$$



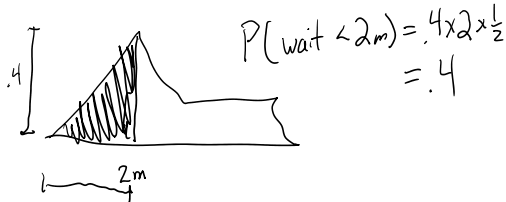
We calculate probabilities by finding areas under curve

Total area = 1 Area between  $x=a, x=b \Rightarrow P(b < x < a)$

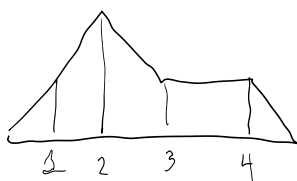
As they are continuous the area under a single point is Zero.



Q What percentage of commuters wait less than 2 min



Q what % of commuters wait between 1 and 4 minutes?



$$= P(2 < x < 3) + P(3 < x < 4) + (P(1 < x < 2) - P(0 < x < 1))$$

$$= \left( \frac{1}{2} \times 2 \times 1 + \frac{1}{2} \times 2 \times 1 \right) + 2 \times 1 + \left( 4 \times 2 \times \frac{1}{2} - 2 \times 1 \times \frac{1}{2} \right)$$

$$= .3 + .2 + .3$$

$$= 80\%$$