Exponential Example:

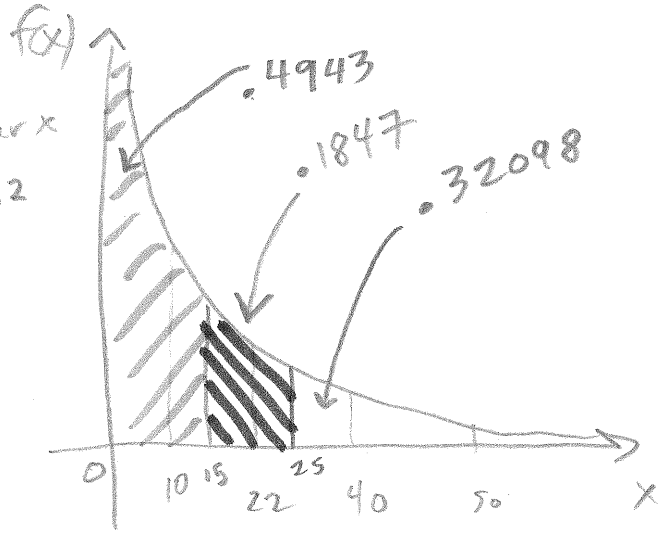
(Time in line)

The average time to get to a Disney ride during peak hours follows a Exponential Distribution.

μ = time to stand in line = 22 minutes

Cumulative Exponential Formula: $= 1 - e^{-x/\mu}$

x = particular x
μ = mean
e = 2.7182



probability stand in line for 15 or less

$P(X \le 15) = 1 - e^{-\frac{15}{22}}$

$= .494303$

Excel 2010 DoT →

$P(X \le 15) =$ =EXPON.DIST(15, 1/22, 1) = .494303

probability stand in line for 25 minutes or more

$P(x \ge 25) = e^{-\frac{25}{22}} = .320984117$

$= 1 -$ EXPON.DIST(25, 1/22, 1) = .32098

Excel 2010 DoT →

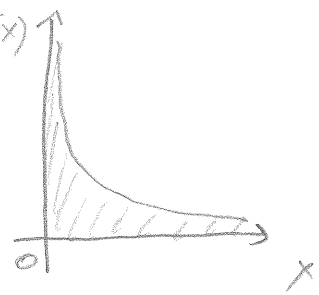
$P(15 \le X \le 25) =$ EXPON.DIST(25, 1/22, 1) − EXPON.DIST(15, 1/22, 1)

$= .1847$

* Area between 2 ⇒ Big Area − small Area

(13) Exponential Probability Distribution

- useful in computing probabilities for the time it takes to complete a task or distance between similar occurences.



Examples:
- ★ Time between arrivals at car wash
- * Time to take a test
- * Distance between potholes on a road

(14) Exponential Density Function

$$f(x) = \frac{1}{\mu} * e^{-x/\mu} \quad \text{for } x \geq 0, \mu > 0$$

★ Property of Exponential Dist. ⟶ μ = mean = σ = standard Deviation

$e \approx 2.71828$ = EXP(1) in Excel

(15) Exponential cumulative Probabilities

$$P(X \leq X_0) = 1 - e^{-X_0/\mu}$$

X_0 = particular X

(16) EXPONDIST Function

called "lambda"

= EXPONDIST (X, $\frac{1}{\mu}$, cumulative)

Excel 2010 Dot

1 or TRUE to get cumulative from 0 to X

0 or FALSE to get height

★ Continuous Random Variable Probability Distribution → Find Area Between 2 X values