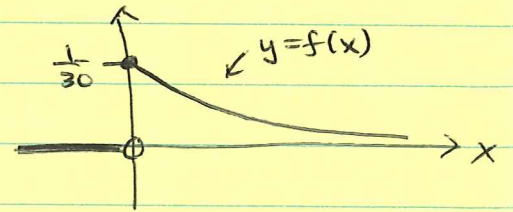


①

Lecture Examples - July 17thProbability:

Suppose Luiz's chalk throwing has the pdf

$$f(x) = \begin{cases} \frac{1}{30} e^{-x/30} & x \geq 0 \\ 0 & x < 0 \end{cases}$$



Q: What is the probability the chalk mark is within 20cm of the target?

$$A: P(X \leq 20) = P(-\infty \leq X \leq 20)$$

$$= \int_{-\infty}^{20} f(x) dx$$

$$= \int_{-\infty}^0 f(x) dx + \int_0^{20} f(x) dx$$

since $f(x) = 0$
when $x < 0$

$$= \int_0^{20} \frac{1}{30} e^{-x/30} dx$$

$$= \frac{1}{30} \cdot \frac{1}{(-1/30)} e^{-x/30} \Big|_0^{20}$$

$$= -e^{-20/30} - -e^0$$

$$= 1 - e^{-2/3} \approx 0.487 \quad (\text{so roughly a 50\% chance})$$