

# Section 1D. Probability Distributions

## Statistics for Data Science

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## Random Variables: Distributions

- ▶ The ***cumulative distribution function*** (**CDF**) of a r.v.  $X$  is defined by

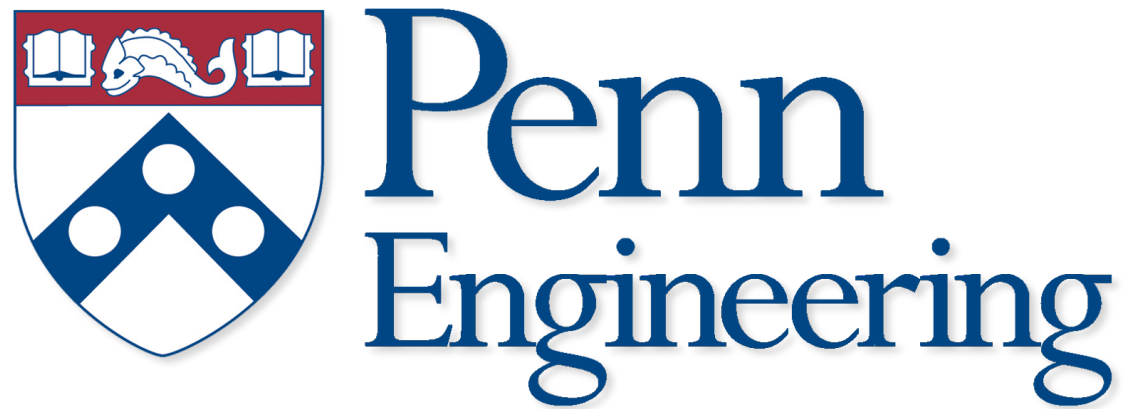
$$F_X(x) = \Pr(X \leq x)$$

- ▶ For *continuous* r.v.'s with differentiable CDFs, we can define the ***probability density function*** (**PDF**) as  $f_X(x) = dF_X(x)/dx$ . Hence, we have that

$$\Pr(X \in A) = \int_{x \in A} f_X(x) dx$$

- ▶ For *discrete* r.v.'s, we can describe its ***probability mass function*** (**PMF**) as

$$p_X(x) = \Pr(X = x)$$



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