

Stat 301 A3

Summer 2019

- (1) Given the following pdf, calculate the following:

$$f(x) = \begin{cases} cy^2 & 0 \leq y \leq 2 \\ 0 & \text{otherwise} \end{cases}$$

- (a) What value of c makes this a valid pdf?
 - (b) Find $F_Y(y)$
 - (c) Find $P(1 \leq Y \leq 2)$
 - (d) Calculate EY, VY, SDY
- (2) Given the following pdf, calculate the following:

$$f(x) = \begin{cases} \frac{1}{200}e^{(-x/200)} & x \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

- (a) What is this distribution and what are its parameter(s)?
 - (b) Find $P(X > 100)$
 - (c) $P(100 < X < 200)$
 - (d) $F_X(x)$
 - (e) EX, VX, SDX
- (3) Given the following pdf, calculate the following:

$$f(x) = \begin{cases} \frac{1}{\Theta_2 - \Theta_1} & \Theta_1 < x < \Theta_2 \\ 0 & \text{otherwise} \end{cases}$$

- (a) What is this distribution and what are its parameter(s)?
 - (b) Find $F_X(x)$
 - (c) Over the interval $[0, 30]$, find $P(25 \leq X \leq 30)$
 - (d) EX, VX, SDX
- (4) Given $Z \sim N(0, 1)$ find the following:
- (a) $P(Z \geq 1.4)$
 - (b) $P(Z > 0.75)$
 - (c) $P(|Z| \leq 2)$
 - (d) $P(|Z| \geq 2)$
 - (e) Find z such that $P(Z < z) = 0.11$
 - (f) Find z such that $P(Z > z) = 0.02$
- (5) Heights of 10 year olds, regardless of gender, closely follow a normal distribution with mean 55 inches and standard deviation 6 inches. Find the following probabilities:
- (a) A randomly chosen 10 year old is shorter than 48 inches
 - (b) A randomly chosen 10 year old is between 60 and 65 inches
 - (c) If the tallest 10% of the class is considered to be “very tall”, what is the height cutoff for “very tall”?
 - (d) The height requirement for *Batman the Ride* at Six Flags Magic Mountain is 54 inches. What percent of 10 year olds cannot go on this ride?