

5. [10 points] For each of the following parts, suppose that F is a nonnegative function defined for all real numbers with the given property or properties. Circle **all** options that apply to F . Note that “pdf” and “cdf” stand for “probability density function” and “cumulative distribution function”, respectively. No justification is required.

a. [2 points] $\int_{-\infty}^{\infty} F(x)dx = 1$ and $F(3) = 4$.

i. ☐ F could be a pdf.

iii. ☐ F is definitely not a pdf.

ii. ☐ F could be a cdf.

iv. ☐ F is definitely not a cdf.

b. [2 points] $\lim_{x \rightarrow \infty} F(x) = 1$ and $F(3) < F(2)$.

i. ☐ F could be a pdf.

iii. ☐ F is definitely not a pdf.

ii. ☐ F could be a cdf.

iv. ☐ F is definitely not a cdf.

c. [2 points] $F'(x) > 0$ for $x \geq 0$.

i. ☐ F could be a pdf.

iii. ☐ F is definitely not a pdf.

ii. ☐ F could be a cdf.

iv. ☐ F is definitely not a cdf.

d. [2 points] $\sum_{n=0}^{\infty} F(-n) = 1$.

i. ☐ F could be a pdf.

iii. ☐ F is definitely not a pdf.

ii. ☐ F could be a cdf.

iv. ☐ F is definitely not a cdf.

e. [2 points] $\int_{-\infty}^x F(t) dt = \frac{1}{1 + e^{-x}}$ for all x .

i. ☐ F could be a pdf.

iii. ☐ F is definitely not a pdf.

ii. ☐ F could be a cdf.

iv. ☐ F is definitely not a cdf.