Example 3.1.3 Let $X$ have the CDF shown in Figure 3.2.
(a) Determine all values of $u$ such that $P\{X = u\} > 0$. (b) Find $P\{X \leq 0\}$. (c) Find $P\{X < 0\}$.

Figure 3.2: An example of a CDF.
Example 3.1.3 Let $X$ have the CDF shown in Figure 3.2.
(a) Determine all values of $u$ such that $P\{X = u\} > 0$. (b) Find $P\{X \leq 0\}$. (c) Find $P\{X < 0\}$.

![Figure 3.2: An example of a CDF.](image)

Solution: (a) The CDF has only one jump, namely a jump of size 0.5 at $u = 0$. Thus, $P\{X = 0\} = 0.5$, and there are no values of $u$ with $u \neq 0$ such that $P\{X = u\} > 0$.
(b) $P\{X \leq 0\} = F_X(0) = 1$. (c) $P\{X < 0\} = F_X(0^-) = 0.5$. 
Example 3.1.4 Let $X$ have the CDF shown in Figure 3.3. Find the numerical values of the following quantities:
(a) $P\{X \leq 1\}$, (b) $P\{X \leq 10\}$, (c) $P\{X \geq 10\}$, (d) $P\{X = 10\}$, (e) $P\{|X - 5| \leq 0.1\}$.

Figure 3.3: An example of a CDF.
Example 3.1.4 Let $X$ have the CDF shown in Figure 3.3. Find the numerical values of the following quantities:
(a) $P\{X \leq 1\}$, (b) $P\{X \leq 10\}$, (c) $P\{X \geq 10\}$, (d) $P\{X = 10\}$, (e) $P\{|X - 5| \leq 0.1\}$.

![Figure 3.3: An example of a CDF.](image)

Solution: 
(a) $P\{X \leq 1\} = F_X(1) = 0.05$.
(b) $P\{X \leq 10\} = F_X(10) = 0.75$.
(c) $P\{X \geq 10\} = 1 - P\{X < 10\} = 1 - F_X(10-) = 0.5$.
(d) $P\{X = 10\} = \Delta F_X(10) = 0.25$.
(e) $P\{|X - 5| \leq 0.1\} = P\{4.9 \leq X \leq 5.1\} = P\{X \leq 5.1\} - P\{X < 4.9\} = F_X(5.1) - F_X(4.9-) = 0.5 - 0.245 = 0.255.$