

For all x ,

$$F(x) = \int_{-\infty}^x f(u) du$$

For $x < 0$,

$$F(x) = \int_{-\infty}^x 0 du = 0.$$

For $0 \leq x \leq 1/2$,

$$F(x) = \int_{-\infty}^0 0 du + \int_0^x \frac{3}{2} du = 0 + \frac{3}{2}u \Big|_0^x = \frac{3}{2}x.$$

For $1/2 < x \leq 1$,

$$\begin{aligned} F(x) &= \int_{-\infty}^0 0 du + \int_0^{1/2} \frac{3}{2} du + \int_{1/2}^x \frac{1}{2} du \\ &= 0 + \frac{3}{4} + \frac{1}{2}u \Big|_{1/2}^x \\ &= \frac{3}{4} + \frac{1}{2}\left(x - \frac{1}{2}\right) = \frac{1}{2}x + \frac{1}{2}. \end{aligned}$$

For $x > 1$,

$$\begin{aligned} F(x) &= \int_{-\infty}^0 0 du + \int_0^{1/2} \frac{3}{2} du + \int_{1/2}^1 \frac{1}{2} du + \int_1^x 0 du \\ &= 0 + \frac{3}{4} + \frac{1}{4} + 0 = 1. \end{aligned}$$