2.

$$D(x) = Ae^{-\sqrt[3]{x}}$$

a)

$$\int_0^{\infty} D(x')\,dx' = 1$$

$$\int_0^{\infty} Ae^{-\sqrt[3]{x'}}\,dx' = 1 \Longrightarrow \int_0^{\infty} e^{-\sqrt[3]{x'}}\,dx' = \frac{1}{A}$$

$Make\ variable\ separation\ u = \sqrt[3]{x'}$
$When\ x \to \infty,\ u \to \infty$
$When\ x \to 0,\ u \to 0$

$$\frac{du}{dx'} = \frac{1}{3}x^{-2/3} \Longrightarrow dx' = 3u^2du$$

$Use\ eq\ 7.20$

$$\int Ae^{-u}\,3u^2du = 3A\Gamma(3) \Longrightarrow A = \frac{1}{3\Gamma(3)}$$

b)

We can make the similar variable sub again and then use eq.7.23.

$$C(x) = \int_0^{x} D(x')\,dx' = \frac{1}{3\Gamma(3)}\int_0^{x} e^{-\sqrt[3]{x'}}dx' \ , \quad \frac{u}{2} = \sqrt[3]{x'} \quad dx' = 3\frac{u}{4}^2 d\frac{u}{2}$$

$$\Longrightarrow \frac{1}{8\Gamma(3)}\int_0^{u^3/8} e^{-u/2}\,3u^2du = \int_0^{u^3/8} \frac{1}{\Gamma(6/2)2^{(n/2)}}e^{-u}\,u^{6/2-1}du = P(6/2,\ x/2)$$

$Where\ P\ is\ the\ incomplete\ gamma\ function.$

2c)d)

$By\ using\ built\ in\ functions\ gamma\ and\ gammainc,\ the\ following\ was\ obtained$