NAME: KEY
Honor Code:

Solve for $x(t)$ assuming all IC's are 0.

$$\frac{d^2 x(t)}{dt^2} + 4 \frac{dx(t)}{dt} + 12 x(t) = 10 \, u(t)$$

$$\left[D^2 + 4D + 12 \right] X(D) = \frac{10}{D}$$

$$X(D) = \frac{10}{D(D^2 + 4D + 12)}$$

$$= \frac{5/6}{D} + \frac{-\frac{5}{6}D + \frac{-20}{6}}{D^2 + 4D + 12}$$

$$= \frac{5/6}{D} + \frac{-\frac{5}{6}(D+2)}{(D+2)^2 + (\sqrt{8})^2} + \frac{-\frac{10\sqrt{8}}{48}\sqrt{8}}{(D+2)^2 + (\sqrt{8})^2}$$

$$x(t) = \left[\frac{5}{6} - \frac{5}{6} e^{-2t} \cos 2\sqrt{2}t - \frac{5\sqrt{8}}{24} e^{-2t} \sin 2\sqrt{2}t \right] u(t)$$