

11. a) THE SHIFT THM STATES THAT

$$\mathcal{L}\{e^{\alpha t} f(t)\} = F(s-\alpha)$$

WHERE $F(s) = \mathcal{L}\{f(t)\}$

HERE, $\mathcal{L}\{t-2\} = \mathcal{L}\{t\} - 2\mathcal{L}\{1\}$

$$= \frac{1}{s^2} - 2 \cdot \frac{1}{s}$$

$$= \frac{1}{s^2} - \frac{2}{s}$$

THUS $\mathcal{L}\{e^{2t}(t-2)\} = \frac{1}{(s-2)^2} - \frac{2}{s-2}$

b) THE STEP FUNCTION THM STATES THAT

$$\mathcal{L}\{u_c(t) f(t-c)\} = e^{-cs} F(s)$$

WHERE $F(s) = \mathcal{L}\{f(t)\}$

THUS $\mathcal{L}\{u_2(t)(t-2)\} = e^{-2s} \mathcal{L}\{t\}$

$$= e^{-2s} \cdot \frac{1}{s^2}$$