

E 2.8

$$T(s) = \frac{K G_1(s) G_2(s) / s}{1 + G_1(s) G_2(s) [(H_2(s) + H_1(s))] + G_1(s) H_3(s) + K G_1(s) G_2(s) / s}.$$

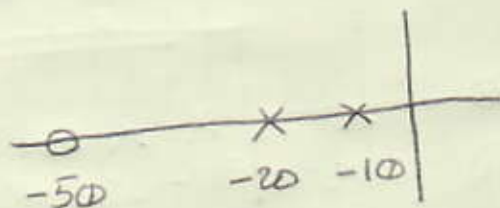
Poles / Zeros HW Solns

1a) $T(s) = \frac{R_0}{s+0.1}$



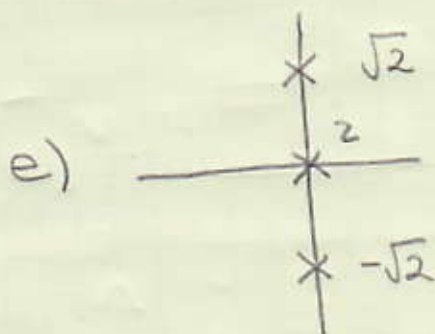
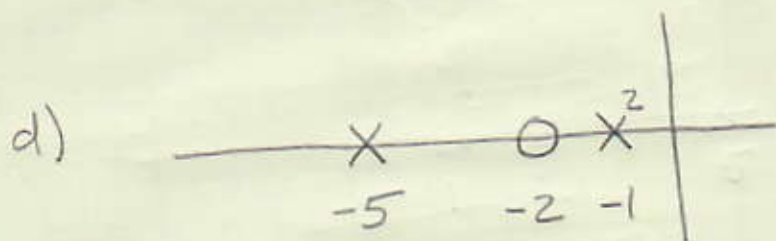
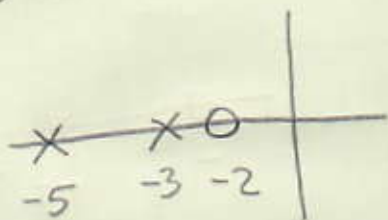
b) $\frac{-30 \pm \sqrt{900 - 800}}{2} = \frac{-30 \pm 10}{2} = -10, -20$

$T(s) = 4 \frac{s+50}{(s+10)(s+20)}$

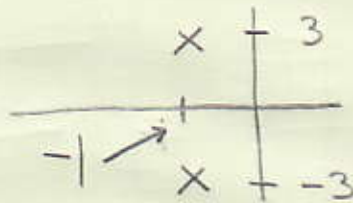


c) $\frac{-8 \pm \sqrt{64 - 60}}{2} = \frac{-8 \pm 2}{2} = -3, -5$

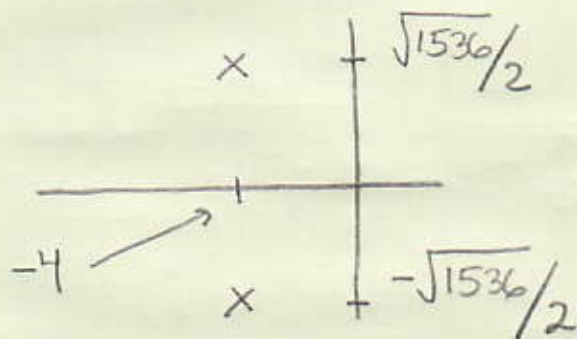
$T(s) = 10 \frac{s+2}{(s+3)(s+5)}$



$$f) \frac{-2 \pm \sqrt{4 - 40}}{2} = \frac{-2 \pm j6}{2} = -1 \pm j3$$



$$g) \frac{-8 \pm \sqrt{64 - 1600}}{2} = \frac{-8 \pm j\sqrt{1536}}{2} = -4 \pm j \frac{\sqrt{1536}}{2}$$



h)

$$\begin{array}{r}
 s^2 + 4s + 3 \\
 s+4 \overline{) s^3 + 8s^2 + 19s + 12} \\
 \underline{s^3 + 4s^2} \\
 4s^2 \\
 \underline{4s^2 + 16s} \\
 3s \\
 \underline{3s + 12} \\
 0
 \end{array}$$

$$T(s) = \frac{12}{(s+4)(s+3)(s+1)}$$

