7.

(1) $\hat{p} = \dfrac{45}{80} = 0.56$

(2) $Z_{\frac{\alpha}{2}}\sqrt{\dfrac{\hat{p}(1-\hat{p})}{n}}$

$= Z_{0.025}\sqrt{\dfrac{0.56 \times 0.44}{80}} = 1.96 \times 0.06 = 0.112$

(3) $\hat{p} \pm Z_{\frac{\alpha}{2}}\sqrt{\dfrac{\hat{p}(1-\hat{p})}{n}}$

$= 0.56 \pm Z_{0.05}\sqrt{\dfrac{0.56 \times 0.44}{80}} =$

$= 0.56 \pm 1.645 \times 0.06$

$= 0.56 \pm 0.1$

$\Rightarrow (0.46, 0.66)$

8.

$\hat{P_1} = 0.55 \qquad \hat{P_2} = 0.6$

$(\hat{P_1} - \hat{P_2}) \pm Z_{\frac{\alpha}{2}}\sqrt{\dfrac{\hat{P_1}(1-\hat{P_1})}{n_1} + \dfrac{\hat{P_2}(1-\hat{P_2})}{n_2}}$

$= (0.55 - 0.6) \pm Z_{0.025}\sqrt{\dfrac{0.55 + 0.45}{100} + \dfrac{0.6 \times 0.4}{100}}$

$= -0.05 \pm 1.96 \times 0.07$

$= -0.05 \pm 0.14$