

$$= \frac{1}{3600} \cdot (60p - 100p^2)$$

(w 3000)  
T<sub>1</sub> 2mk

$$mse(T_2) = var(T_2) = var\left(\frac{1}{4} \cdot \left(\frac{x}{10} + \frac{z}{20}\right)\right) = \frac{1}{4^2} \left[ \frac{1}{10^2} var(x) + \frac{1}{20^2} var(z) \right]$$

$$\frac{1}{4^2} \left[ \frac{1}{10^2} \cdot 20p \cdot (1-p) + \frac{1}{20^2} \cdot 40p \cdot (1-2p) \right] =$$

$$\frac{1}{80}p - \frac{1}{80}p^2 + \frac{1}{160}p - \frac{1}{80}p^2 = \frac{3}{160}p - \frac{1}{40}p^2$$

(w 3000)  
T<sub>2</sub> 2mk

$$mse(T_3) = var(T_3) + (E(T_3) - p)^2 = var\left(\frac{x+y+z}{70}\right) + \left(E\left(\frac{x+y+z}{70}\right) - p\right)^2 =$$

$$\frac{1}{70^2} [20p \cdot (1-p) + 20p^2 \cdot (1-p^2) + 40p \cdot (1-2p)] + \left( \frac{60p + 20p^2}{70} \right)^2 - 2 \cdot p \left( \frac{60p + 20p^2}{70} \right) + p^2 =$$

$$\frac{1}{70^2} [20p - 20p^2 + 20p^2 - 20p^4 + 40p - 80p^2] + \frac{(60p)^2 + 2 \cdot 60p \cdot 20p^2 + (20p^2)^2}{70^2}$$

$$- 2p \left( \frac{60p + 20p^2}{70} \right) + p^2 =$$

$$\frac{1}{70^2} [-20p^4 - 80p^2 + 60p] + \frac{1}{70^2} [3600p^2 + 2400p^3 + 400p^4]$$

$$\frac{-2p}{70} (60p + 20p^2) + p^2 =$$

$$\frac{-20p^4 - 80p^2 + 60p + 3600p^2 + 2400p^3 + 400p^4 - 8400p^2 - 2800p^3 + 400p^2}{70^2} =$$

$$\frac{380p^4 - 400p^3 + 20p^2 + 60p}{70^2} = \frac{20p \cdot [19p^3 + 20p^2 + p + 3]}{245}$$