ENGR 371 - W - 2010

#1) Civil, Elec, Mechanical

a) $9! = 362\,880$ ∴

b) $\binom{18}{9} 9!$ or $18P9$ ∴

c) 7 Mech
6 Civi
5 Elec
must include 3 M, 3 C, 3 E

$\binom{7}{3} = 35$
$\binom{6}{3} = 20$
$\binom{5}{3} = 10$

$\binom{7}{3}\binom{6}{3}\binom{5}{3} \cdot 9!$

$(35)(20)(10) = 7000 \times 9!$ ∴

d) $P = \frac{1}{18}$
$n = 5$
$x =$ presentation
$P(x=1)$

$\binom{5}{1}\left(\frac{1}{18}\right)^1\left(\frac{17}{18}\right)^4 = 0.221$ ∴

#2) $L_1 = 100$ total = 600 $P(D|L_1) = 0.01$
$L_2 = 200$ $P(D|L_2) = 0.02$
$L_3 = 300$ $P(D|L_3) = 0.03$

a) $P(L_1) = \frac{100}{600} = \frac{1}{6}$ ∴

b) $P(D) = P(D|L_1)P(L_1) + P(D|L_2)P(L_2) + P(D|L_3)P(L_3)$
$(0.01)\left(\frac{1}{6}\right) + (0.02)\left(\frac{1}{3}\right) + (0.03)\left(\frac{1}{2}\right)$

$P(D) = 0.02\overline{3}$ ∴

c) $P(L_2|D) = \frac{P(D|L_2)P(L_2)}{P(D)} = \frac{(0.02)\left(\frac{1}{3}\right)}{0.02\overline{3}} = 0.2857$ ∴

#3) $p = 0.08$

a) $P(x>2) = 1 - P(x \leq 2) = 1 - P(x=1) + P(x=0) + P(x=2)$

$n = 10$

$x =$ success (caught) $\binom{10}{x} 0.08^{x} 0.92^{10-x}$

$p = 0.08$

$= 1 - 0.92^{10} + (10)(0.08)(0.92)^{9} + (45)(0.08)^{2} 0.92^{8}$

$= 0.04007$ ∴

b) $p = 0.04007$

$x =$ success (eat lobster)

$\binom{3}{x} 0.04007^{x} 0.9599^{3-x}$

$n = 3$

$P(x \geq 1) = 1 - P(x=0) = 1 - 0.9599^{3} = 0.11547$ ∴

c) $\mu = np$

$2 = np \longrightarrow 2 = n(0.04007) \rightarrow n = 49.9$ days ∴