

Solutions to HW#3

(50 total points, each score will be converted into 100 points)

Problem 3.1

1) $n = 10$, $p = .04$ (2 points total: 1 point each)

2) Four assumptions:

a) two outcomes, disk drive malfunctioning and disk drive functioning (2 points)

b) constant disk drive malfunctioning rate, $p = .04$ (2 points)

c) independence, each disk drive malfunctioning is independent of the other disk drives malfunctioning (2 points)

d) fixed sample size, $n = 10$ (2 points)

3) Yes (2 points)

4) a) $P(X = 0) = \binom{10}{0} (.04)^0 (1 - .04)^{10} = .6648$

(3 points total : 1 point for setting up formula correctly, 2 points for calculations)

b) $P(X = 1) = \binom{10}{1} (.04)^1 (1 - .04)^9 = .2770$

(3 points total : 1 point for setting up formula correctly, 2 points for calculations)

c) $P(X \geq 2) = 1 - P(X = 0) - P(X = 1) = 1 - .6648 - .2770 = .0582$

(7 points total: 1 point for setting up formulas correctly, 6 points for calculations)

d) $P(3 \leq X \leq 6) = P(X=3) + P(X=4) + P(X=5) + P(X=6)$
 $.0058 + .0004 + .0002 + .0000007 = .0064$

(9 points total: 1 point for setting up formulas correctly, 8 points for calculations)

Problem 3.2

1) $P(\text{Husband has type B}) = .11$ (3 points)

2) $P(\text{ Husband has type A and Wife has type A}) = .3 * .3 = .09$ (4 points)

3) $P(\text{ at least one of them has type AB}) = (.10 * .90) + (.90 * .10) + (.10 * .10) = .19$

(4 points total: 1 point for each part and 1 point for final answer)

4) $P(\text{that husband and wife have the same blood type}) = (.3 * .3) + (.11 * .11) + (.49 * .49) + (.10 * .10) = .3522$

(5 points total: 1 point for each part and 1 point for final answer)