**ChE 320\_Spr\_17\_HW 2 Solution**

**Total: 100 pts.** (Please do not cut point more than once for the same mistake, e.g. If there are 3 parts in a question, answer was calculated wrong in the 1st part. But the method was correct for the 2nd and 3rd part; give student the points of 2nd and 3rd part*. If applicable, credits for the answersare also given for using correct units*)

* 1. (20 pts)

1. A∩B = visit to hospital 4 that result in LWBS = 242.Then P(A∩B) = 242/22,252 = 0.011

*+2 for correct method, +2 for answer*

b) A’ = visit to hospital 1, 2, or 3 = 5,292 + 6,991 + 5,640 = 17,923. Then P(A’) = 17,926 /22,252 = 0.805 *+2 for correct method, +2 for answer*

c) A∪B = visit to hospital 4 or a visit that results in LWBS, or both = 195 + 270 + 246 + 4329 = 5,040. Then P(A∪B) = 5,040 /22,252 = 0.226 *+2 for correct method, +2 for answer*

d) A∪B’ = visit to hospital 4 or a visit that does not result in LWBS, or both = (5,292 – 195) + (6,991 – 270) + (5,640 – 246) + 4,329 = 21,541. Then P(A∪B’) = 21,541/22,252 = 0.968. *+2 for correct method, +2 for answer*

e) A’∩B’= visit to hospital 1, 2, or 3 and does not result in LWBS = (5,292 – 195) + (6,991 – 270) + (5,640 – 246) = 17,212. Then P(A’∩B’) = 17,212/22,252 = 0.774. Another approach is to write P(A’∩B’) = P(A∪B)’ = 1 – P(A∪B) = 1 – 0.226 = 0.774. *+2 for correct method, +2 for answer*

**3.24** (20 pts)

a), by symmetry, or by calculation. *+3 for answer*

b) *+2 for correct method, +1 for answer*

c) *+2 for correct method, +1 for answer*

d) P(X < −2) = 0 *+2 for correct method, +1 for answer*

e) P(X < 0 or X > −0.5) = 1 *+4 for answer*

f) , then, x = 0.9655 *+2 for correct method, +2 for answer*

**3.28** (20 pts)

a) *+3 for correct method, +3 for answer*

b) *+3 for correct method, +3 for answer*

c) *P*(2.0080<X<2.0090) = *F*(2.0090)-*F*(2.0080) = 0.8 – 0.6 = 0.2 *+4 for correct method, +4 for answer*

**3.50** (20 pts)

a) P(X > 0.5) = 

= P(Z > 2)

= 1 − 0.97725

= 0.02275 *+3 for correct method, +3 for answer*

b) P(0.4 < X < 0.5) = P(0 < Z < 2)

= P(Z < 2) − P(Z < 0) *+3 for correct method, +3 for answer*

= 0.47725

c) P(X > x) = 0.90. Therefore,  = −1.28 and x = 0.336. *+4 for correct method, +4 for answer*

**3.58** (20 pts)

X is a lognormal distribution with θ=2 and ω2=4

a)  *+3 for correct method, +3 for answer*

b)



*+3 for correct method, +3 for answer*

c)



*+3 for correct method, +3 for answer*

d) The product has significantly degraded over the first 500 hours. The degradation is less significant after 500 hours. *+2 for any reasonable answer*