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

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

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

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

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.

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.

**3.24**

a), by symmetry, or by calculation.

b)

c)

d) P(X < −2) = 0

e) P(X < 0 or X > −0.5) = 1

f) , then, x = 0.9655

**3.28**

a)

b)

c) *P*(2.0080<X<2.0090) = *F*(2.0090)-*F*(2.0080) = 0.8 – 0.6 = 0.2

**3.46**

a) P(X < 39) = P(Z<(39-35)/2) = P(Z < 2) = 0.97725

b) P(X < 29) = P(Z<(29-35)/2) = P(Z < -3) = 0.00135

**3.50**

a) P(X > 0.5) = 

= P(Z > 2)

= 1 − 0.97725

= 0.02275

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

= P(Z < 2) − P(Z < 0)

= 0.47725

c) P(X > x) = 0.90. Therefore,  = −1.28 and x = 0.336.

**3.58**

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

a) 

b)



c)



d) The product has significantly degraded over the first 500 hours. The degradation is less significant after 500 hours.

**3.72**

r/λ = 4, so r = 4λ; Also, r/λ2 = 2; Using substitution, 4λ/λ2 = 2, and λ = 2; giving r = 8.