# **Assignment NO. 1 week1-week4**

# **Stat101**

# True or False:

1. False
2. True
3. True
4. True
5. True
6. False

# Multiple Choice Questions:

1. A & C
2. A
3. C
4. C
5. B
6. C

# Essay Questions:

1. a. The probability that a randomly selected student is a social science major = 60 / 100 = 0.6

b. The probability that a randomly selected student is a social science major given that they are female = 30 / 50 = 0.6

1. a. Property 1: Σp(x) = 1

0.22 + 0.38 + 0.1 + 0.3 = 1 “proved”

 Property 2: 0 < p(x) < 1

 0 < 0.22 < 1

 0 < 0.38 < 1

 0 < 0.1 < 1

 0 < 0.3 < 1 “proved”

b. mean: µ = Σ(x.p(x)) = 0 \* 0.22 + 1 \* 0.38 + 2 \* 0.1 + 3 \* 0.3 = 1.48

 variance: σ2 = Σ[(x - µ)2 \* p(x)]

 = [(0 – 1.48)2 \* 0.22] + [(1 – 1.48)2 \* 0.38] + [(2 – 1.48)2 \* 0.1] + [(3 – 1.48)2 \* 0.3] = 1.2896

1. Binomial Distribution:

n = 6

p = 0.25

q = 1 – p = 1 – 0.25 = 0.75

x = 4

p(x = 4) = $\frac{n!}{\left(n-x\right)!x!}\*p^{x}\*q^{n-x}$ = $\frac{6!}{\left(6-4\right)! 4!}\*0.25^{4}\*0.75^{6-4}$ = 0.03296

µ = n \* p = 6 \* 0.25 = 1.5

σ2 = n \* p \* q = 6 \* 0.25 \* 0.75 = 1.125

σ = $\sqrt{σ^{2}}$ = $\sqrt{1.125}$ = 1.0607

1. a) P(Z < 2.37) = 0.9911

b) P(Z > 1.82) = 1 – P(Z < 1.82) = 1 – 0.9656 = 0.0344

c) P(-1.18 < Z < 2.1) = P(Z < 2.1) – P(Z < -1.18) = 0.9821 – 0.119 = 0.8631

1. N = 250

µ = 12

σ = 8

n = 4

µx̄ = µ = 12

σx̄ = $\frac{σ}{\sqrt{n}}$ = $\frac{8}{\sqrt{4}}$ = 4

8 < x̄ < 25

ZL = (x - µx̄) / σx̄ = $\frac{8-12}{4}$ = -1

ZR = (x - µx̄) / σx̄ = $\frac{25-12}{4}$ = 3.25

-1 < Z < 3.25

P(-1 < Z < 3.25) = 0.8407

1. X̄ = 101.82

σ = 1.2

n = 6

x̄ - E < µ < x̄ + E

E = Zα/2 \* $\frac{σ}{\sqrt{n}}$

α = 0.05 🡪 α / 2 = 0.025

Zα/2 = Z0.025 = 1.96

E = 1.96 \* $\frac{1.2}{\sqrt{6}}$ = 0.9602

101.82 – 0.9602 < µ < 101.82 + 0.9602

 100.86 < µ < 102.78