

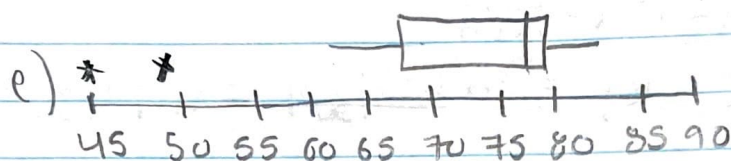
## Quiz

1) a)  $1^{st} = 73 + 0.25(74 - 73) = 73.5$   
 $2^{nd} = 79 + 79/2 = 79$   
 $3^{rd} = 3(20 + 1)/4 = 80$

b)  $80 - 73.5 = 6.5$  TqR

c) 45, 73.5, 79, 80, 82

d) 45 & 48



2) Parameters / Statistics

- 3) Designed experiment, researcher altered & designed this  
 4) observational study, nothing was influenced, just recorded  
 5) designed experiment / observational study  
     ↳ controlled so they can have cause and effect      ↳ no cause so no effect

6) cluster

7) stratified

8) Convenience ↳ impossible to fully represent pop. being studied

9)  $\frac{0.35(0.05)}{0.25(0.05) + 0.35(0.04)(.02)} = .406$

10) a)  $0.3 + P(B) - 0 = 0.4$

b)  $0.3 + P(B) - 0.3P(B) = P(B)(1 - 0.3) = 0.4/0.7$

11) a)  $8(x(1/6)^x(5/6)^{8-x})$   
      $= 8(2(1/6)^2(5/6)^6)$  b) ✓  
      $= 0.2605$

12) a) .50

b) not independent

c) .7475

d)  $-.3475$

$$\text{cov}(X, Y) = E(XY) - E(X) \cdot E(Y)$$

$$\text{var}(5X - 4Y) = \text{var}(5X) + \text{var}(4Y) - 2\text{cov}(5X, 4Y)$$

13) a)  $1 - P(X < 15) = 1 - (1 - e^{(-15/10)}) = e^{(-1.5)} = 0.223$

b)  $1 - P(X < 5) = 1 - (1 - e^{(5/10)}) = e^{0.5} = 0.607$

14) a)  $\int_0^2 12(x^2 - x^3) dx = 12 \left( \frac{1}{3}x^3 - \frac{1}{4}x^4 \right) \Big|_0^2 = 12 \left( \frac{8}{3} - \frac{16}{4} \right) = 12 \left( \frac{8}{3} - 4 \right) = 12 \left( \frac{8 - 12}{3} \right) = 12 \left( -\frac{4}{3} \right) = -16$

b)  $\int_0^1 x^2 \times 12(x^2 - x^3) dx = 12 \int_0^1 (x^4 - x^5) dx = 12 \left( \frac{1}{5}x^5 - \frac{1}{6}x^6 \right) \Big|_0^1 = 12 \left( \frac{1}{5} - \frac{1}{6} \right) = 12 \left( \frac{6 - 5}{30} \right) = 12 \left( \frac{1}{30} \right) = \frac{12}{30} = 0.4$

c)  $\int_0^1 12(x^2 - x^3) dx = 12 \left( \frac{x^3}{3} - \frac{x^4}{4} \right) \Big|_0^1 = 12 \left( \frac{1}{3} - \frac{1}{4} \right) = 12 \left( \frac{4 - 3}{12} \right) = 12 \left( \frac{1}{12} \right) = 1$

15)  $R_1, R_2, R_3$

$1100, 1500, R_3$

b)  $P(R_1 + R_2 + R_3 > 4000) = .0808$

16) a)  $\sigma_x^2 = 0.76, \sigma_y^2 = 0.76$

$f_{X,Y}(x,y) = \frac{3}{2}(x^2 + y^2)$

17) a)  $20! / (12! 3! 5!) (-.6)^{12} (.15)^3 (.25)^5$

b)

18) a)  $X \sim H(500, 100, 20)$

b)  $\binom{100}{5} \binom{400}{15}$

$\binom{500}{20}$

19) a)  ${}^8P_3 = \frac{8!}{(8-3)!}$

$= 336$

b)  ${}^8C_3 = \frac{8!}{3!(8-3)!}$

$= 56$

20) a)  $\frac{19!}{1! 8! 10!}$

b)  $\frac{16!}{1! 8! 3! 5!}$

$\frac{6(56)(5)}{1928} = 0.0222$



21) a)  $X \sim \text{Gamma}(4, 0.5)$   $P(T \leq 1) = .433$   $e^{-0.5}(0.5^4)/4!$   
 b)  $P(Y \geq 3)$

22)  $2.0022/\sqrt{6} = 0.633$   $\alpha = 0.10 = (1.17, 3.49)$

23)  $H_0: \mu_{\text{new}} - \mu_{\text{old}} = 0$   $z = 4.224$  There is sufficient evidence  
 $H_1: \mu_{\text{new}} - \mu_{\text{old}} > 0$   $P < \alpha$

24) a)  $H_0: \text{Null } \mu = 2$   $H_A: \mu \neq 2$

b)  $0.52391/\sqrt{50} = 0.11715$   $t = (1.881 - 2)/0.11715 = 1.0158$

c) The data doesn't support the claim.

d) We fail to reject false null hypothesis Type II Error

25) a)  $H_0: \mu = 2$   $t = (7.38 - 8.2)/\sqrt{2.83^2/12 + 9.84^2/123} = -0.5109$   
 $H_1: \mu \neq 2$   $P = 0.3051$   $P > \alpha$   
 Not enough evidence

b)  $(7.38 - 8.2) \pm 1.975(\sqrt{2.83^2/12 + 9.84^2/123})$   
 $= -3.9894, 2.3494$   
 $-3.9894 < \mu_1 - \mu_2 \leq 2.3494$

c) 95% confident difference mean between  $-3.9894$  &  $2.3494$

27)  $H_0: \mu = 300$   $t = \sqrt{3}(363 - 300)/6.5574 = 16.64$   
 $H_1: \mu > 300$

$z = 4.52$

$z = 16.64 > 2.92$

$P = 0$

The data doesn't indicate significant

28)  $P > 0.50$

$D = 72/136$   $p = 0.53$   $H_0: P = 0.50$   $H_1: P < 0.50$

$z = \frac{0.53 - 0.50}{\sqrt{0.50 \cdot 0.50}} = 0.71$   $P\text{-value} = 0.241$

fails to reject the null hypo, not sufficient evidence.

29)  $H_0: \mu = 75$   $n - 1 = 50 - 1 = 49$

$H_1: \mu \neq 75$

$\frac{81.2 - 75}{\sqrt{50}} = 0.9733$

Fail to reject  $50.2/50$

$H_0$

$P = 0.3544$

Not sufficient evidence

30) a) Predict iodine level, octane number

b)  $50 = 93.9 - (0.2094)SS.66 = 75.2124$

$y = 75.2124 - 0.2094x$

$r = -0.89$

c)  $y = 75.235 - 0.21x$

e)  $r = 0.89$ , strong negative relationship