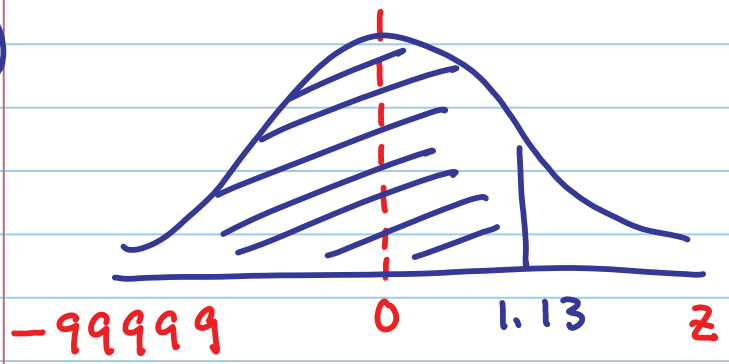
College Prep Stats Final Review

Note Title 5/9/2016

1)



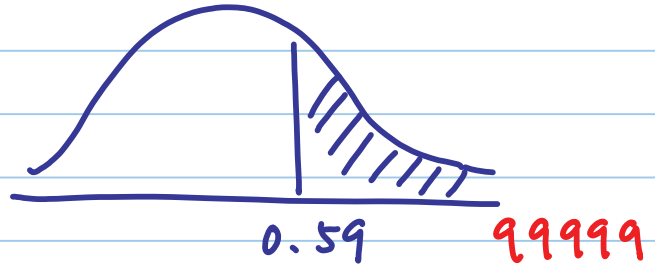
LL UL μ σ

normalcdf (-99999, 1.13, 0, 1)

= 0.8710

C

2)

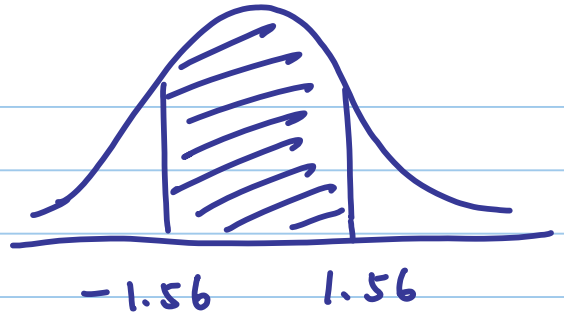


normalcdf (0.59, 99999, 0, 1)

= 0.2776

B

3)

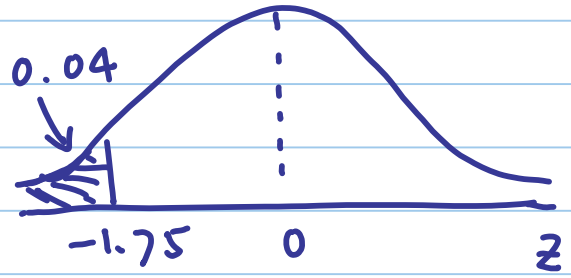


normalcdf (-1.56, 1.56, 0, 1)

= 0.8812

D

4)



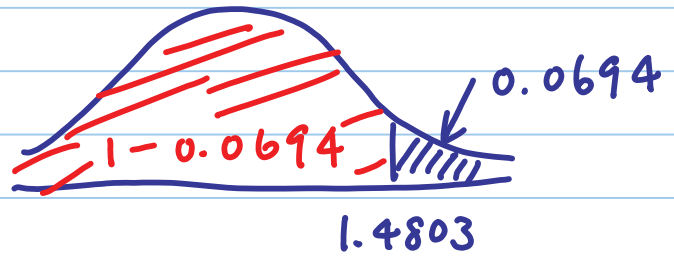
Area, μ, σ

invNorm (0.04, 0, 1)

= -1.75

A

5)

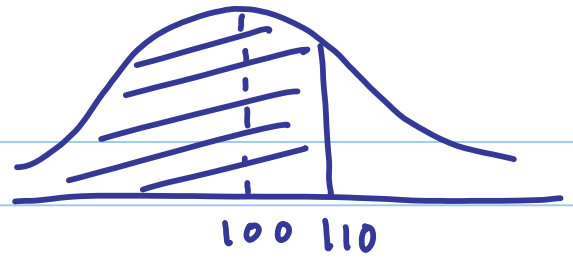


invNorm (1-0.0694, 0, 1)

= 1.4803

D

7)



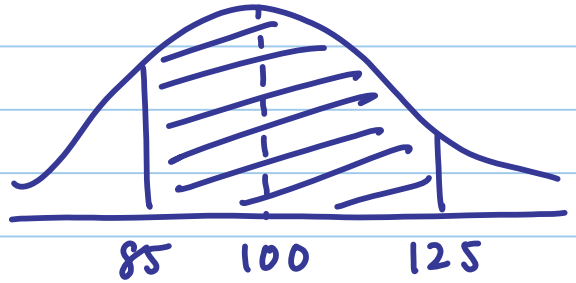
$\mu = 100, \quad \sigma = 15$

$P(IQ < 110)$

$=$ normal cdf $(-99999, 110, 100, 15)$

$= 0.7475$ B

8)

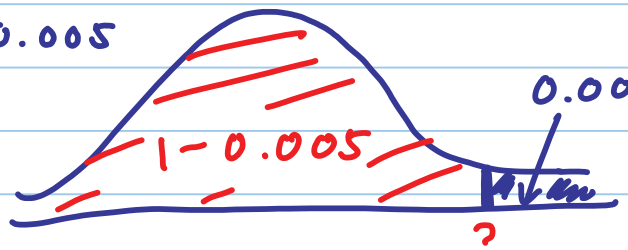


$P(85 < IQ < 125)$

$=$ normal cdf $(85, 125, 100, 15)$

$= 0.7936$ B

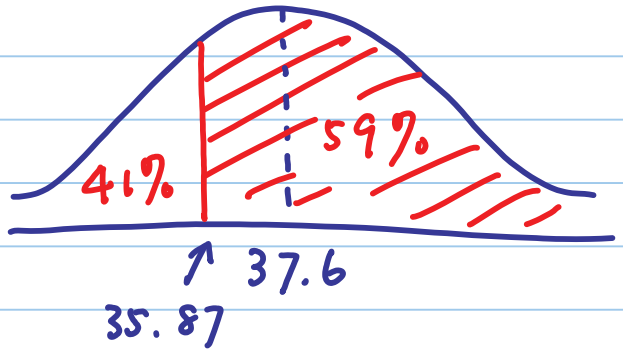
6)



invNorm $(1-0.005, 0, 1)$

$= 2.5758$ D

9) $\mu = 37.6$ $\sigma = 7.6$

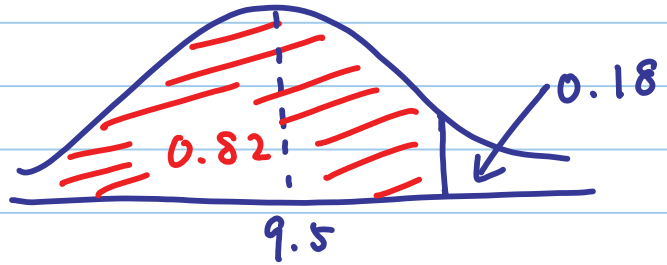


invNorm(0.41, 37.6, 7.6)

$= 35.87 \approx 35.9$

B

10) $\mu = 9.5$ $\sigma = 1.8$



invNorm(0.82, 9.5, 1.8)

$= 11.14 \approx 11.1$

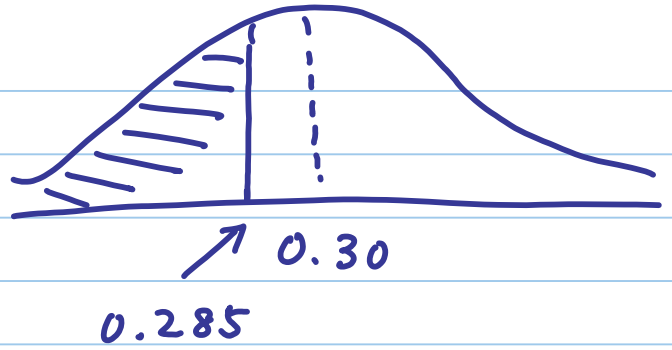
A

(1) $\mu = 0.3$ $\sigma = 0.01$

$P(d < 0.285)$

= normalcdf(−99999, 0.285, 0.3, 0.01)

= 0.0668



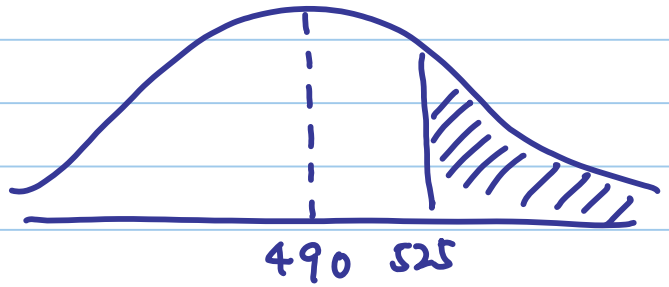
B

(2) $\mu = 490$, $\sigma = 45$

$P(s > 525)$

= normalcdf(525, 99999, 490, 45)

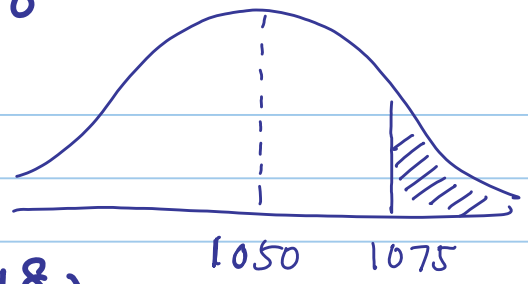
= 0.2183



B

13) $\mu = 1050, \quad \sigma = 218 \quad n = 50$

$P(E > 1075) \qquad \sigma = \frac{\sigma_{old}}{\sqrt{n}}$



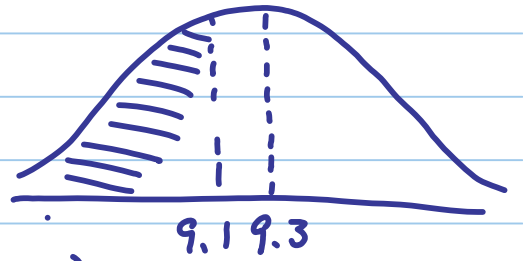
$= \text{normalcdf}(1075, 99999, 1050, \frac{218}{\sqrt{50}})$

$= 0.2087$

A

14) $\mu = 9.3, \quad \sigma = 1.1 \quad n = 70$

$P(t < 9.1) \qquad \sigma = \frac{1.1}{\sqrt{70}}$



$= \text{normalcdf}(-99999, 9.1, 9.3, 1.1/\sqrt{70})$

$= 0.0641$

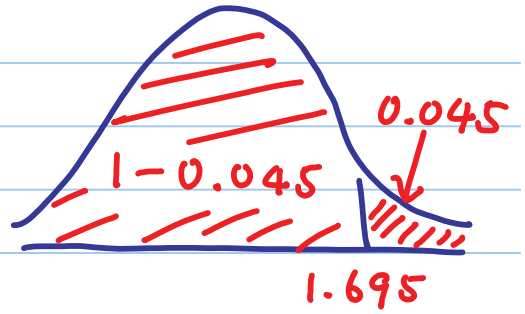
C

15) $CL = 91\% \longrightarrow \alpha = 0.09$

$z_{\frac{0.09}{2}} = z_{0.045} = \text{invNorm}(1 - 0.045, 0, 1)$

$= 1.695$

D

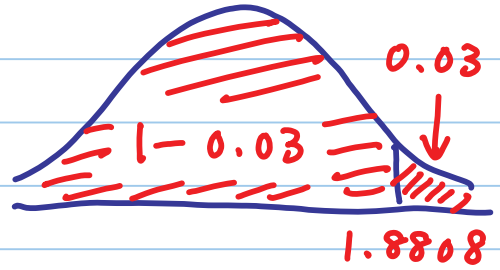


16) $CL = 94\% \longrightarrow \alpha = 0.06$

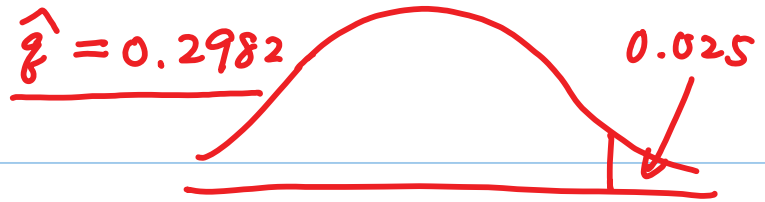
$z_{\frac{0.06}{2}} = z_{0.03} = \text{invNorm}(1 - 0.03, 0, 1)$

$= 1.8808$

D



17) $\hat{p} = \frac{x}{n} = \frac{1704}{2428} = 0.7018$



$$E = z_{\frac{\alpha}{2}} \sqrt{\frac{\hat{p}\hat{q}}{n}} = z_{0.025} \sqrt{\frac{\hat{p}\hat{q}}{n}}$$

$$= 1.96 \sqrt{\frac{0.7018\,(0.2982)}{2428}} = 0.0182$$

C

18) $n = 10000, \quad \hat{p} = 0.4 \;, \rightarrow \hat{q} = 0.6$

$$E = z_{0.025} \sqrt{\frac{\hat{p}\hat{q}}{n}} = 1.96 \sqrt{\frac{0.4\,(0.6)}{10000}} = 0.0096$$

D

$\alpha = 0.06$

19) $E = z_{0.03} \frac{\sigma}{\sqrt{n}} = 1.8808 \cdot \frac{13.5}{\sqrt{92}} = 2.6472$

A

$\alpha = 0.10$

20) $E = z_{0.05} \frac{\sigma}{\sqrt{n}} = 1.6449 \frac{3.6}{\sqrt{560}} = 0.2502$

D

$\alpha = 0.01 \quad \frac{\alpha}{2} = 0.005$

21) $n = 30, \quad \bar{x} = 83, \quad s = 13.5$ σ is unknow

$E = t_{\frac{\alpha}{2}} \frac{s}{\sqrt{n}} = 2.7564 \frac{13.5}{\sqrt{30}} = 6.7938$

99% CI: $(\bar{x} - E, \bar{x} + E) = (83 - 6.7938, 83 + 6.7938)$

$= (76.2062, 89.7938)$

C

22) $n = 27, \quad \bar{x} = 76.2, \quad s = 21.4$

$\alpha = 0.05$

$$E = t_{\frac{\alpha}{2}} \frac{s}{\sqrt{n}} = t_{0.025} \frac{s}{\sqrt{n}} = 2.0555 \frac{21.4}{\sqrt{27}}$$

$$= 8.4656$$

95% CI: $(76.2 - 8.4656, \quad 76.2 + 8.4656)$

$= (67.7344, \quad 84.6656)$ **A**

23) Refer to P. 360.

σ is known Normal , $\alpha = 0.02$

$$z_{\frac{0.02}{2}} = z_{0.01} = \text{invNorm}(0.99,\ 0,\ 1) = 2.3263$$

D

24) σ is unknown, Normal , $\alpha = 0.10$

$$t_{\frac{0.10}{2}} = t_{0.05} = \text{invT}(0.95,\ 10-1) = 1.8331$$

A

25) σ is known, Not Normal $n = 9 < 30$

Neither

B

26) $\hat{p} = \frac{UL + LL}{2} = \frac{0.507 + 0.047}{2} = 0.277$

$E = \frac{UL - LL}{2} = \frac{0.507 - 0.047}{2} = 0.23$

$\hat{p} \pm E = 0.277 \pm 0.23$

D

27) $n = 30, \quad \hat{p} = 0.05, \quad \alpha = 0.05$

$H_0: \; p = 0.041 \qquad H_1: \; p > 0.041$ **C**

28) Requirement check.

1) Simple Random Sample

2) Binominal Distribution (outcome = "S" or "F")

3) $np \geq 5$ and $nq \geq 5$

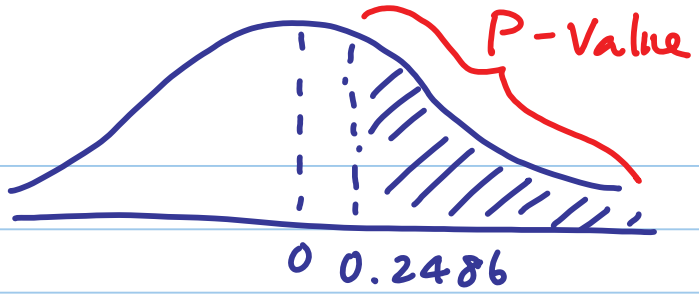
$30 \cdot (0.041) = 1.23 \qquad 30(0.959) = 28.77$

$$z = \frac{\hat{p} - p}{\sqrt{\frac{pq}{n}}} = \frac{0.05 - 0.041}{\sqrt{\frac{0.041(0.959)}{30}}} = 0.2486$$

A

29) normalcdf(0.2486, 99999, 0, 1)

= 0.4018



P-Value = 0.402 > 0.05 D

is the area that test statistic cuts off

30) Fail to reject H_0, There is not sufficient evidence to support that the proportion of population suffers from professional problems is more than 4.1% A

31) $H_0: \mu = 43$ $H_1: \mu \neq 43$ **B**

32) $$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}} = \frac{38.1 - 43}{\frac{10.5}{\sqrt{40}}} = -2.9515$$ **B**

33) T-Test

P-Value $= 0.0053 < 0.05$

reject H_0. **A**

34) **D**

35) $H_0: p_1 = p_2$ $H_1: p_1 \neq p_2$ **C**

36) $x_1 = 110, \quad n_1 = 500$

$x_2 = 63, \quad n_2 = 450$

$$\bar{p} = \frac{x_1 + x_2}{n_1 + n_2} = \frac{110 + 63}{500 + 450} = \frac{173}{950} = 0.1821$$

C

37) 2-PropZTest

$z = 3.1901$

$\bar{p} = 0.1821$

38) 2 - PropZTest

$$z = \frac{\hat{p}_1 - \hat{p}_2 - (\mu_1 - \mu_2)}{\sqrt{\frac{\bar{p}\bar{q}}{n_1} + \frac{\bar{p}\bar{q}}{n_2}}} = 3.1901$$

C

39) P-Value $= 0.0014 < 0.10$ D

reject H_0

40) $H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$ C

41) 2-SampTTest

$$t = \frac{\bar{x}_1 - \bar{x}_2 - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} = 2.2476$$

A

42 P-Value = 0.0269 > 0.02

Fail to reject H_0

43) A

44) $H_0: \mu_d = 0, \quad H_1: \mu_d > 0$

Female more talkative than Male

Male → L1

Female → L2

Diff. → L3 = L2 − L1

B

45) 1-Var Stat L3

$\bar{d} = 6.8 \qquad s_d = 9.9420$

C

46) T-Test L3

$$t = \frac{\bar{d} - \mu_d}{\frac{s_d}{\sqrt{n}}} = \frac{6.8 - 0}{\frac{9.942}{\sqrt{10}}} = 2.1629$$

A

47) $P\text{-Value} = 0.0294 < 0.04$

reject H_0

48) D