M118
FALL 2000

QUIZ 11

NAME: _____

DUE: Beginning of class Monday, October 30, 2000.

1) a) (5 PTS.) Let Z be the standard normal random variable. Using the table for Z, find $Pr[0 \leq Z \leq 1.55]$.

LOOK ON TABLE

Answer: $Pr[0 \leq Z \leq 1.55] =$ .4394

b) (5 PTS.) Let Z be the standard normal random variable. Using the table for Z, find $Pr[-1.55 \leq Z]$.

$$Pr[-1.55 \leq Z] = Pr[-1.55 \leq Z \leq 0] + Pr[0 \leq Z]$$
$$= Pr[0 \leq Z \leq 1.55] + Pr[0 \leq Z]$$
$$= .4394 + .5$$

Answer: $Pr[-1.55 \leq Z] =$ .9394

c) (5 PTS.) Let Z be the standard normal random variable. Using the table for Z, find $Pr[-2 \leq Z \leq 1.55]$.

$$Pr[-2 \leq Z \leq 1.55] = Pr[-2 \leq Z \leq 0] + Pr[0 \leq Z \leq 1.55]$$
$$= Pr[0 \leq Z \leq 2] + Pr[0 \leq Z \leq 1.55]$$
$$= .4772 + .4394 = .9166$$

Answer: $Pr[-2 \leq Z \leq 1.55] =$ .9166

d) (10 PTS.) Let Z be the standard normal random variable. Using the table for Z, find $Pr[-2 \leq Z \leq -1.55]$.

$$Pr[-2 \leq Z \leq -1.55] = Pr[-2 \leq Z \leq 0] - Pr[-1.55 \leq Z \leq 0]$$
$$= Pr[0 \leq Z \leq 2] - Pr[0 \leq Z \leq 1.55]$$
$$= .4772 - .4394 = .0378$$

Answer: $Pr[-2 \leq Z \leq -1.55] =$ .0378

SEE OTHER SIDE

e) (10 PTS.) Let X be a normal random variable with standard deviation 3.4 and average 10. Find $Pr[8.3 \leq X]$.

$$Z = \frac{X - \mu}{\sigma} = \frac{X - 10}{3.4}$$

$$Pr(8.3 \leq X) = Pr\left(\frac{8.3 - 10}{3.4} \leq Z\right) = Pr(-1/2 \leq Z)$$

$$= Pr(0 \leq Z \leq 1/2) + Pr(0 \leq Z)$$

$$= .1915 + .5$$

$$= .6915$$

Answer: $Pr[8.3 \leq X] =$ .6915

f) (15 PTS.) Let X be a normal random variable with standard deviation 3.4 and average 10. Suppose ~~$Pr[-a \leq X \leq a] = .7108$~~. Find the value of a.

$Pr[10 - a \leq X \leq 10 + a] = .7108$

$$Z = \frac{X - \mu}{\sigma} = \frac{X - 10}{3.4}$$

$$X = 10 + a \Rightarrow Z = \frac{10 + a - 10}{3.4} = \frac{a}{3.4}$$

$$X = 10 - a \Rightarrow Z = \frac{10 - a - 10}{3.4} = -\frac{a}{3.4}$$

$$Pr(10 - a \leq X \leq 10 + a) = Pr\left(-\frac{a}{3.4} \leq Z \leq \frac{a}{3.4}\right)$$

$$= 2\,Pr\left(0 \leq Z \leq \frac{a}{3.4}\right) = .7108$$

$$\Rightarrow Pr\left(0 \leq Z \leq \frac{a}{3.4}\right) = .3554$$

LOOK UP TABLE IN "REVERSE" $\Rightarrow$ $\frac{a}{3.4} = 1.06 \Rightarrow a = 1.06 \cdot 3.4 = 3.604$

Answer: $a =$ 3.604