11/23/2004
Dr. Lunsford

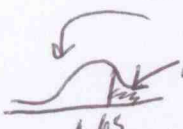
MA371 Applied Prob/Stats I
Quiz 6

Name: Solution
(20 Points Total)

I. Suppose Z is a standard normal random variable. (4 points each, 8 total)

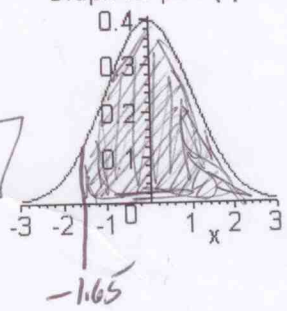
(a) Find $P(Z > -1.65)$ and represent the probability on the graph to the right.

Via table Vb we have 0.0495 for $z = 1.65$



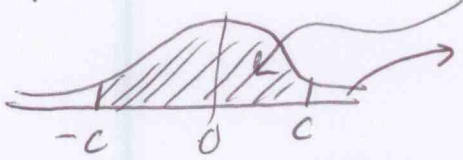
$\therefore P(Z > -1.65) = 1 - .0495 = \boxed{.9505}$

Graph for part (a)



(c) Find a number c such that $P(|Z| \le c) = .8584$

$\Leftrightarrow P(-c < Z < c) = .8584$



$= \frac{1-.8584}{2} = .0708$

so $\boxed{c = 1.47}$ from table Vb

II. Suppose the random variable X has the normal distribution $N(\mu = 75, \sigma^2 = 100)$. Please answer the following. (9 points total)

$\Rightarrow \sigma = 10$

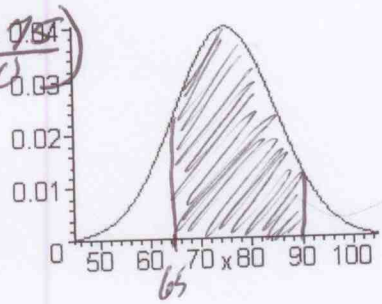
(a) Find $P(65 < X < 90)$. Show the probability graphically on the graph of the p.d.f given below. (5 points)

$P(65 < X < 90) = P\left(\frac{65-75}{10} < \frac{X-75}{10} < \frac{90-75}{10}\right)$

$= P(-1 < Z < 1.5)$

$= (.5 - .1587) + (.5 - .0668)$

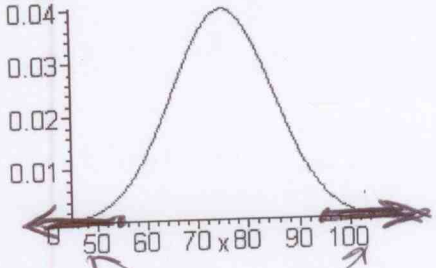
$= \boxed{.7745}$



(b) If $X = 92$ is a single sample from this distribution then how many standard deviations is this sample from the distribution mean? Justify your answer. Plot an interval on the x-axis of the graph below that represents all values of X whose distance from the mean is at least two standard deviations. (4 points)

$z = \frac{92-75}{10} = \boxed{1.7 \text{ stand. devs from } \mu}$

2 std devs from μ: $75 - 2(10) = 55$
$75 + 2(10) = 95$



these values of X are at least 2σ from μ.

III. What is your favorite dish that is served for the Thanksgiving feast at your abode? (3 points)

Cornbread stuffing!