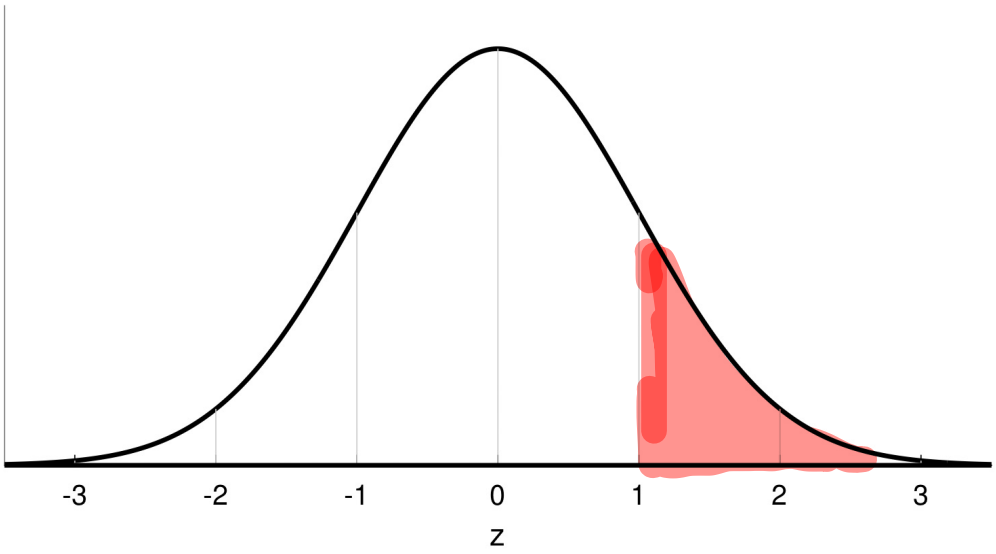
Z-tables

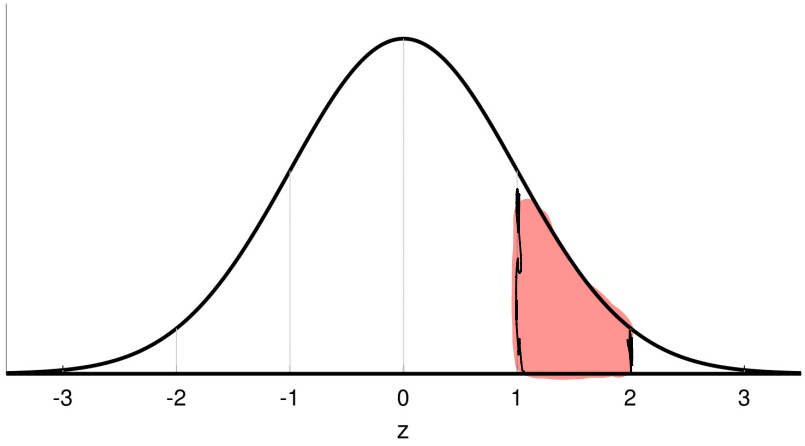
Standard normal distribution has a mean $\mu = 0$ and standard deviation $\sigma = 1$



Example: find the area above z=1.

area = 0.1587

Example: What is the area under the standard normal distribution between 1 and 2?



area above $z=1$ minus area above $z=2$

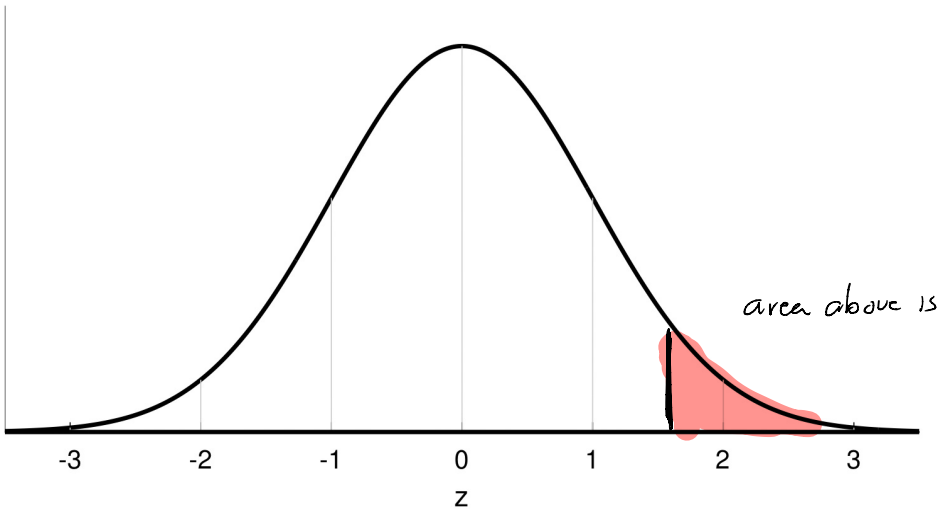
$= 0.1587 - 0.0228 = 0.1359$

Finding z-scores from areas

Example: Find the z score for which 5% of the area under the standard normal distribution lies above.

find z for 3rd column in z-table is close to 0.05

$z = 1.64$

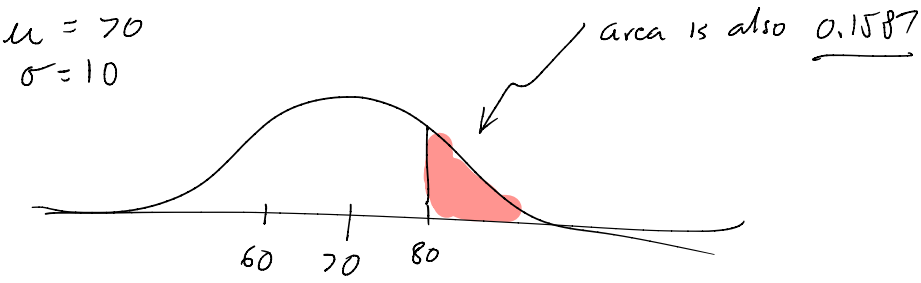


area above is 0.0500

The Normal Distribution

Example: Suppose you have a population of test scores has a mean of 70 and a standard deviation of 10. What proportion of scores fall above 80?

$\mu = 70$
$\sigma = 10$

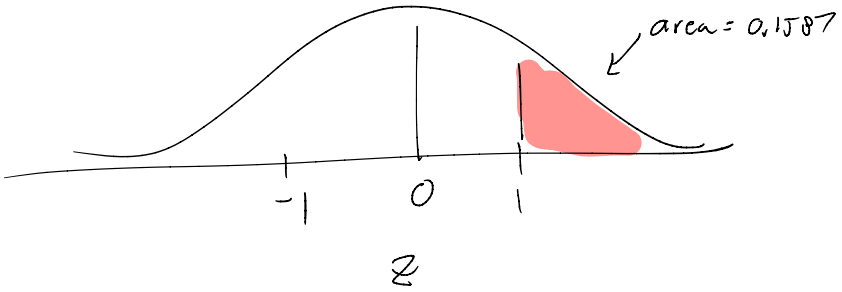


if X is 80 then z-score is $z = 1$

$$z = \frac{X - \mu}{\sigma}$$ converts scores to z-scores

$$z = \frac{80 - 70}{10} = 10$$

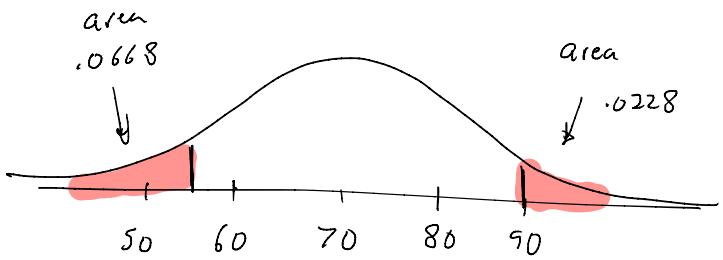
area above $z = 1$ for the standard normal is 0.1587



Converting scores to areas

Example: What porportion of scores fall either below 55 or above 90?

$\mu = 70 \quad \sigma = 10$

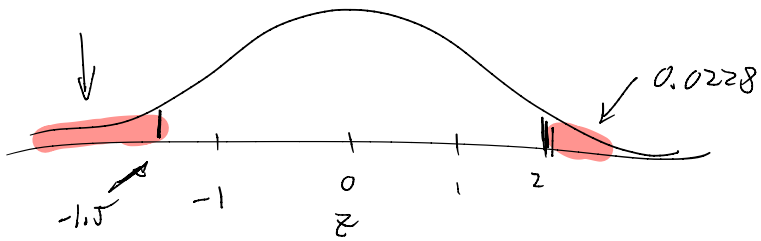


find sum of areas for the two tails.

for $x = 55$, $z = \frac{x-\mu}{\sigma} = \frac{55-70}{10} = -1.5$

area below $z = -1.5$ is...

area = 0.0668

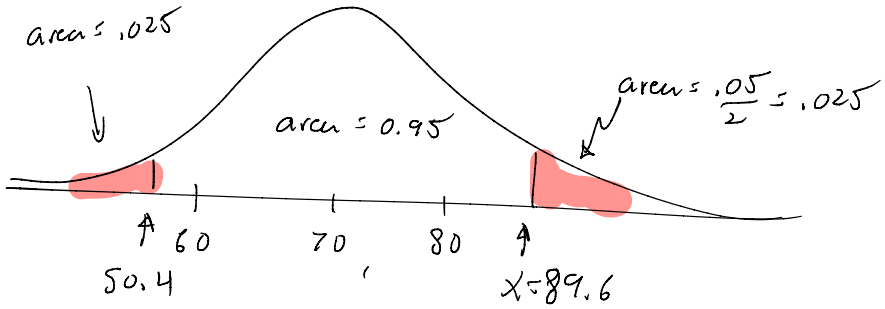


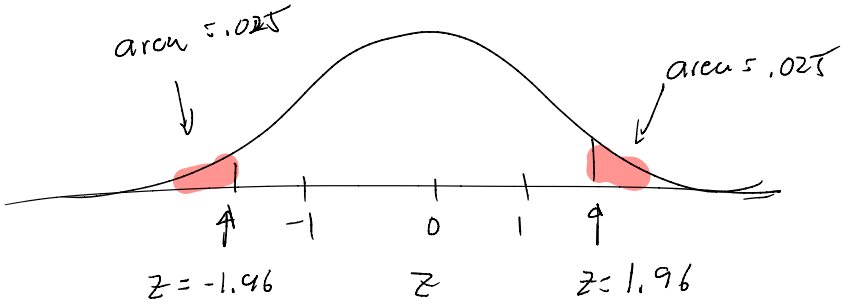
for $x = 90$, $z = \frac{90-70}{10} = 2$, area above $z = 2$ is... .0228

answer: $.0668 + .0228 = .0896$

Example: What test scores bracket the middle 95% of all scores?

$\mu = 70, \ \sigma = 10$





converts z-scores to test scores

$$z = \frac{x-\mu}{\sigma} \ ; \quad z\sigma = x-\mu \ ; \quad x = \mu + z\cdot\sigma$$

$X_1 = 70 + (1.96)(10) = 70 + 19.6 = 89.6$

$X_2 = 70 - (1.96)(10) = 70 - 19.6 = 50.4$

answer is: 50.4 and 89.6