

Example: Susan took two tests. On test A she scored 65 and on test B she scored 29. The mean for test A was 50 with a standard deviation of 10. The mean for test B was 20 with a standard deviation of 5.

Which one has a better relative position?

$$Z_A = \frac{65 - 50}{10} = 1.5$$

$$Z_B = \frac{29 - 20}{5} = 1.8$$

Observations above the mean are positive when standardized and observations below the mean are negative when they are standardized.

Problem: If you score 27 on your ACT Math what would be a comparable score on the SAT Math if:

SAT $\mu = 500$ and $\sigma = 100$ ACT $\mu = 18$ and $\sigma = 6$

$$z = \frac{x - \mu}{\sigma}$$

$$z = \frac{27 - 18}{6} = 1.5 \quad \text{for ACT}$$

$$1.5 = \frac{x - 500}{100}$$

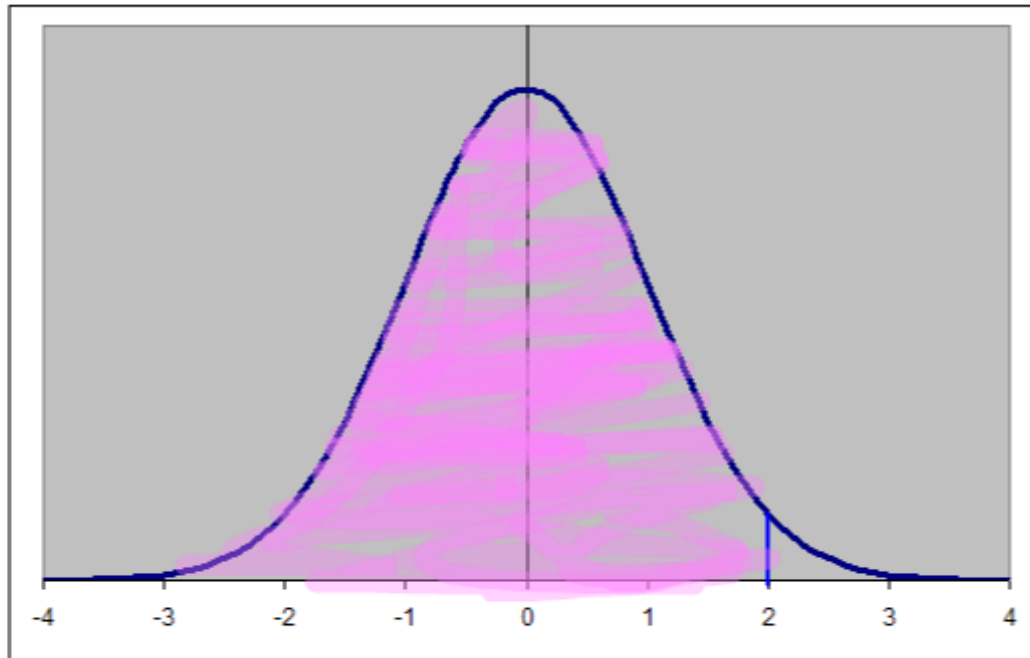
$$150 = x - 500$$

$$x = 650 \quad \text{for SAT}$$

The table gives you the area to the left of z .
Problems: You should always draw a picture.

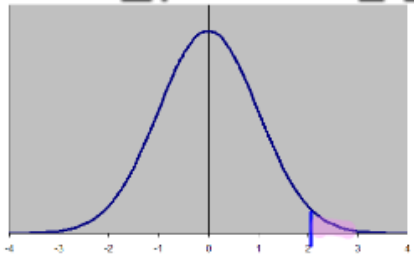


1. Find the area to the left of $z = 2$



.9772

2. Find the area to the right of $z = 2$



$$1 - .9772 = .0228$$

3. Find the area if $-2.5 \leq z \leq 1$

$$.8413 - .0062 = .8351$$

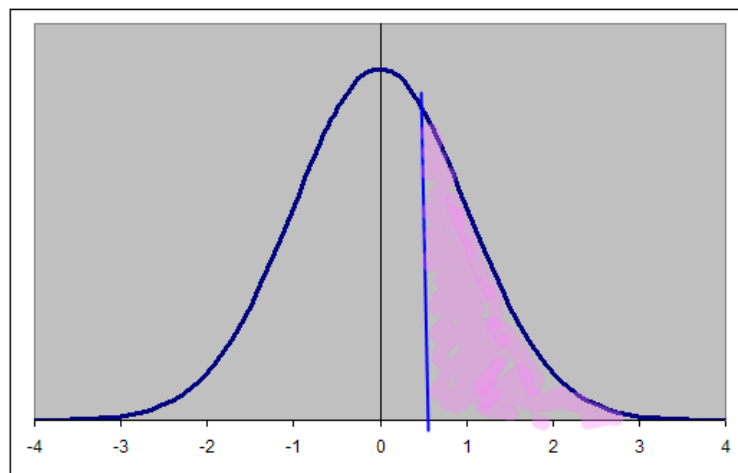


For problems 4-6 use the following information: Heights of women: $\mu = 63.6$
and $\sigma = 2.5$.

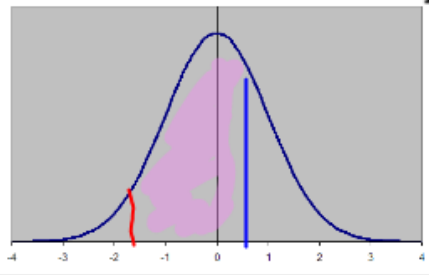
4. Find the probability that a woman is taller than 65 inches.

$$z = \frac{65 - 63.6}{2.5} = .56$$

$$1 - .7123 = .2877$$



5. Find the probability that a woman is between 60 and 65 inches.

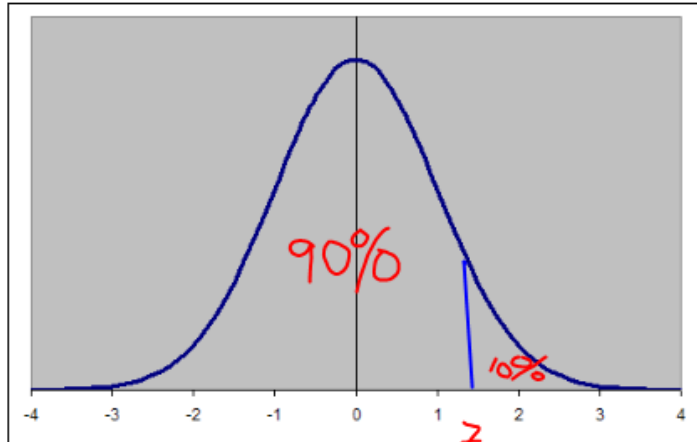


$$z = \frac{60 - 63.6}{2.5} = -1.44$$

$$z = .51$$

$$.7123 - .0749 = .6374$$

6. How tall must a woman be to be in the top 10%.



look backwards in chart

$$z = \frac{x - \mu}{\sigma}$$

$$1.28 = \frac{x - 63.6}{2.5}$$

$$3.2 = x - 63.6$$

$$x = 67.1$$

	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319