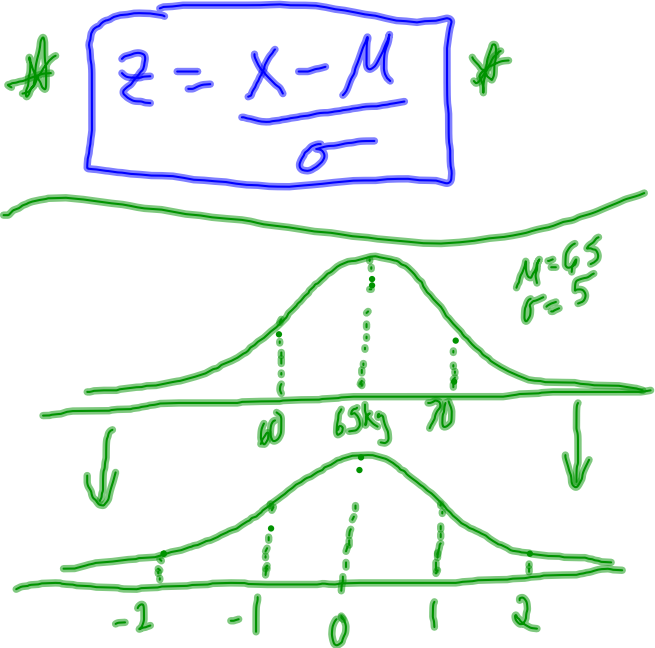
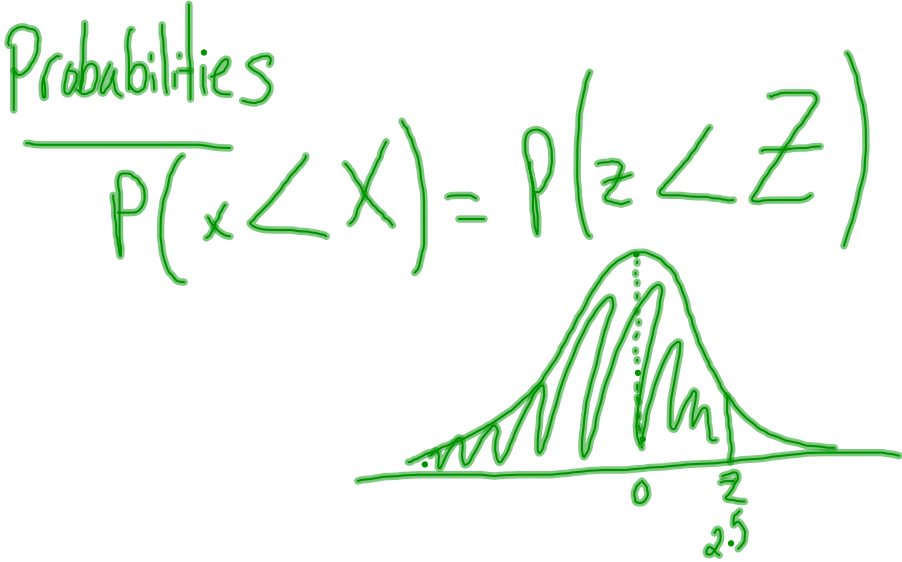


Probabilities & Z - Scores

How do I find the probability that a specific value falls in a certain range if the value is not a multiple of the standard deviation?



>> **Z- Score:**
Measures how far a value is from the mean as a multiple of the standard deviation.



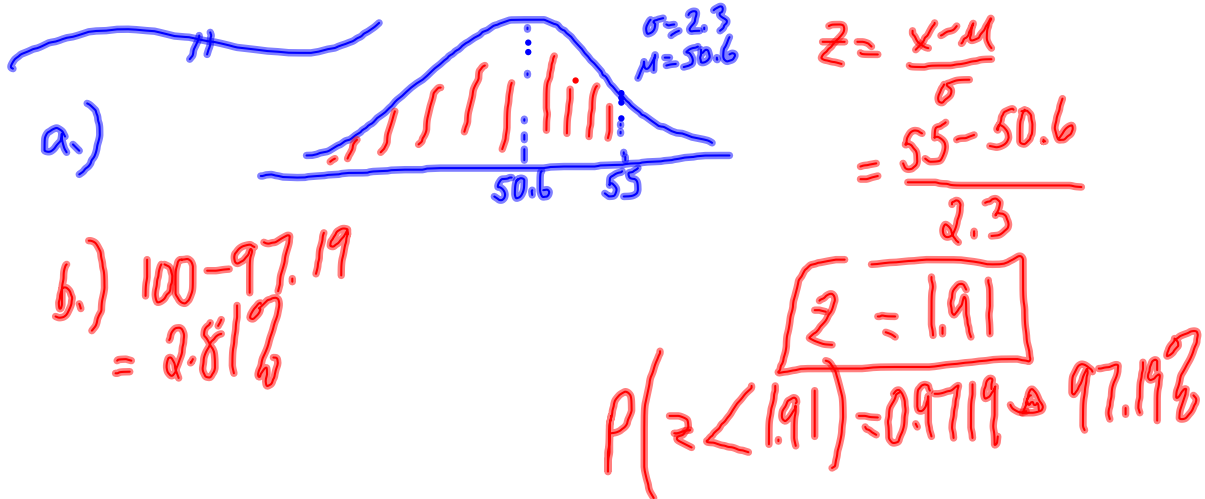
Example

The mean score on a test (out of 60) was found to be 50.6 and the standard deviation was determined to be 2.3.

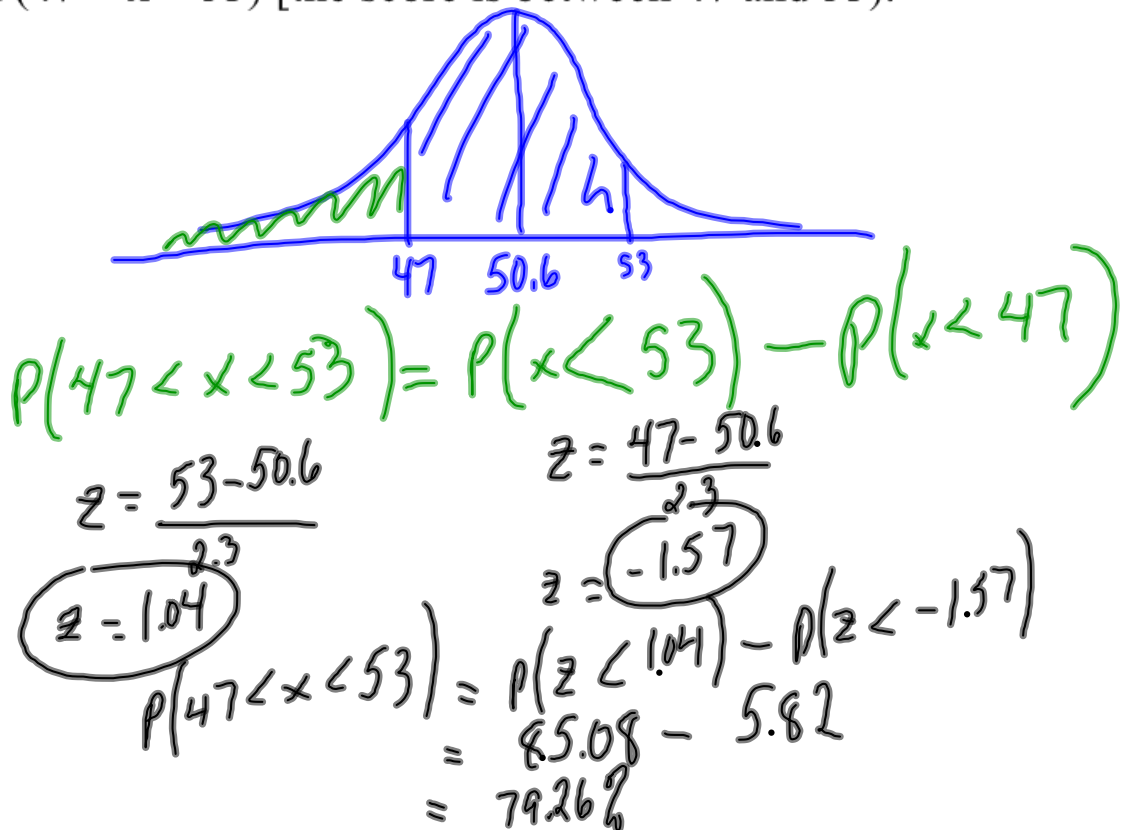
a) determine the probability that a student's score chosen at random is less than 55.

b) determine the probability that a student's score chosen at random is greater than 55.

c) $P(47 < x < 53)$ [the score is between 47 and 53].



c) $P(47 < x < 53)$ [the score is between 47 and 53].



Practice sheet

#1a.) $P(x < 25)$

$$z = \frac{25-25}{5} = 0 \Rightarrow$$

$$P(z < 0) = 50\%$$



(c.)

$$z = \frac{30-25}{5}$$

$$= 1$$
$$84.13\%$$

b.) $P(x < 20)$

$$z = \frac{20-25}{5}$$

$$= -1$$

$$P(x < 20) = 0.1587$$
$$= 15.87\%$$

$$P(x > 30) = 1 - P(x < 30)$$

$$= 1 - 0.8413$$

$$= 0.1587$$

or 15.87%

d.) $P(20 < x < 30) = P(x < 30) - P(x < 20)$

$$z = \frac{30-25}{5}$$

$$= 1$$

$$z = \frac{20-25}{5}$$

$$= -1$$

$$P(x < 30) - P(x < 20)$$

$$= 0.8413 - 0.1587$$

$$= 0.6826$$
$$68.26\%$$

