5.3: Finding Probabilities given values

If we convert to standard scores using the z-score formula, then procedures for working with all normal distributions are the same as those for the standard normal distribution.

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

Round z-scores to two decimal places.

Finding probabilities.

1. Draw a normal curve and shade the region to be determined.

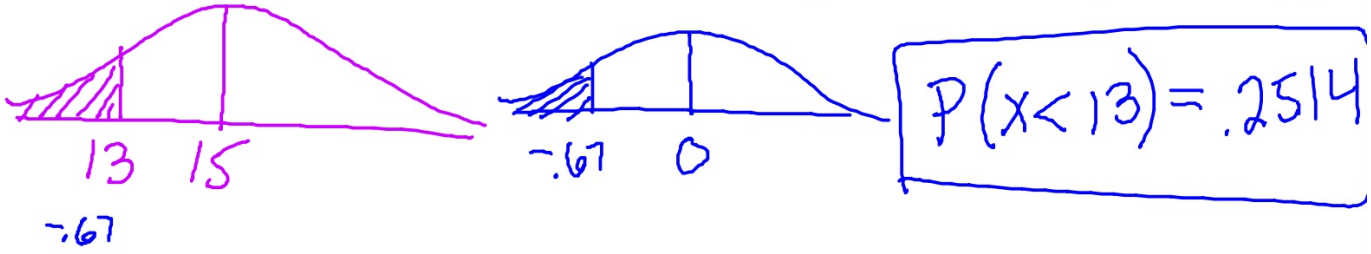
2. Find the standard z-score(s).

3. Use the chart to determine the probabilitiy (area of the shaded region).

#1 The weights of adult rhesus monkeys are normally distributed with a mean of 15 pounds and a standard deviation of 3 pounds. A rhesus monkey is randomly selected. Find the probability that the monkey's weight is:

$\mu = 15 \quad \sigma = 3$

a) less than 13 pounds $z = \frac{x-\mu}{\sigma} = \frac{13-15}{3} = -.67$

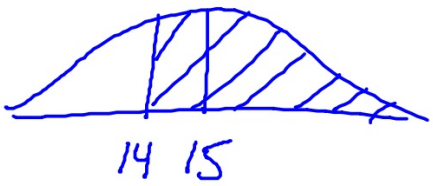


$P(x<13) = .2514$

#1 The weights of adult rhesus monkeys are normally distributed with a mean of 15 pounds and a standard deviation of 3 pounds. A rhesus monkey is randomly selected. Find the probability that the monkey's weight is:

$\mu = 15 \quad \sigma = 3$

b) more than 14 pounds $Z = \frac{14-15}{3} = -.33$

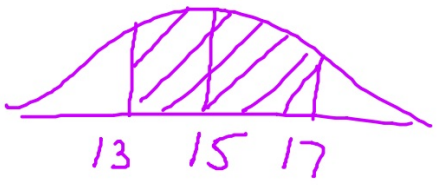


$P(x>14) = .6293$

#1 The weights of adult rhesus monkeys are normally distributed with a mean of 15 pounds and a standard deviation of 3 pounds. A rhesus monkey is randomly selected. Find the probability that the monkey's weight is

$\mu = 15 \quad \sigma = 3$

c) between 13 and 17 pounds



$z = \frac{13-15}{3} = -.67$

$z = \frac{17-15}{3} = .67$

$P(13 < x < 17) =$

$.7486 - .2514$

$.4972$

10. White blood cell (WBC) count per cubic milliliter of whole blood has approximately the N(7500, 1750) distribution. If a WBC count is less than 3900 is defined to be a probable risk, what proportion of all WBC counts fall in the at-risk group?