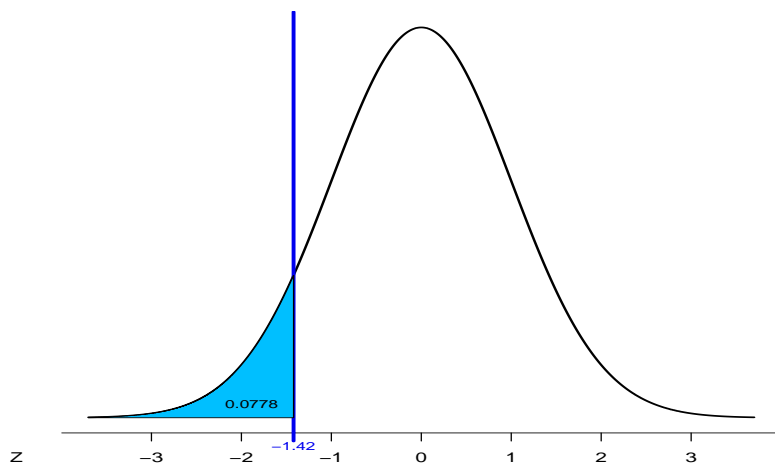
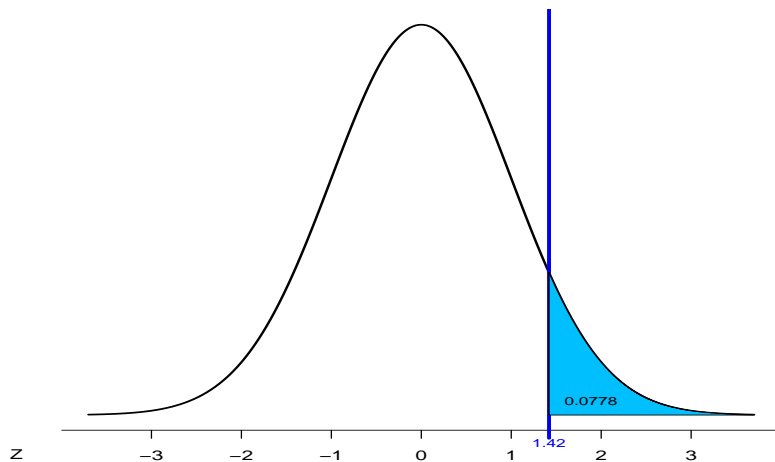


1. (7.12) (p. 153) - Sketch curves

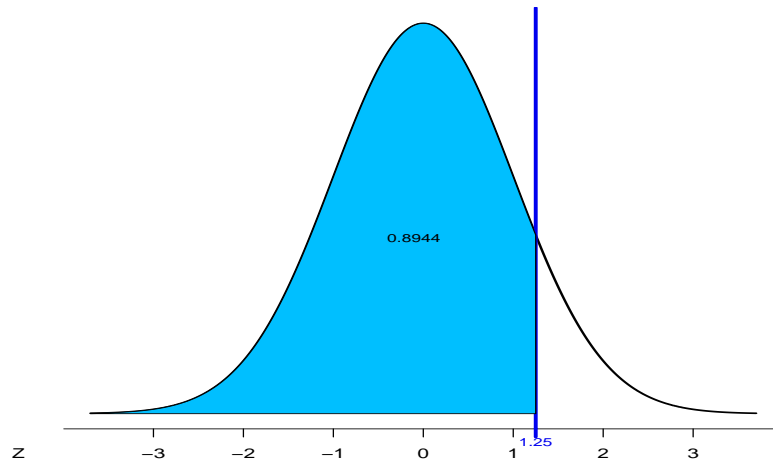
(a) $\Pr(Z < -1.42) = 0.0778$



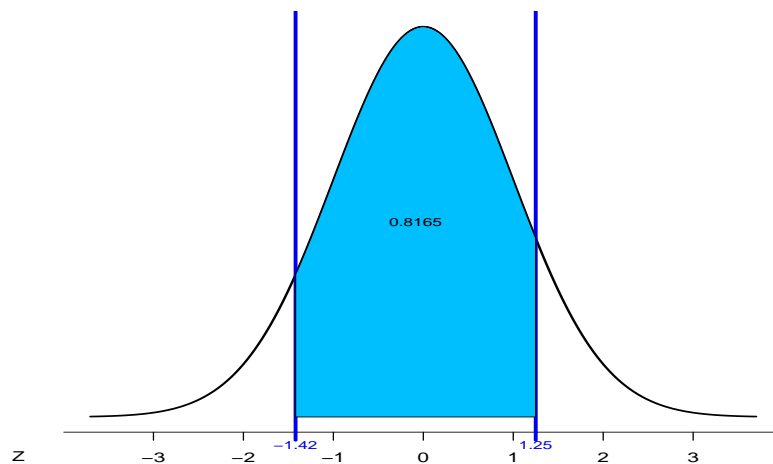
(b) $\Pr(Z > 1.42) = 1 - \Pr(Z \leq 1.42) = 1 - 0.9222 = 0.0778$



(c) $\Pr(Z < 1.25) = 0.8944$



(d) $\Pr(-1.42 < Z < 1.25) = \Pr(Z < 1.25) - \Pr(Z < -1.42) = 0.8944 - 0.0778 = 0.8166$



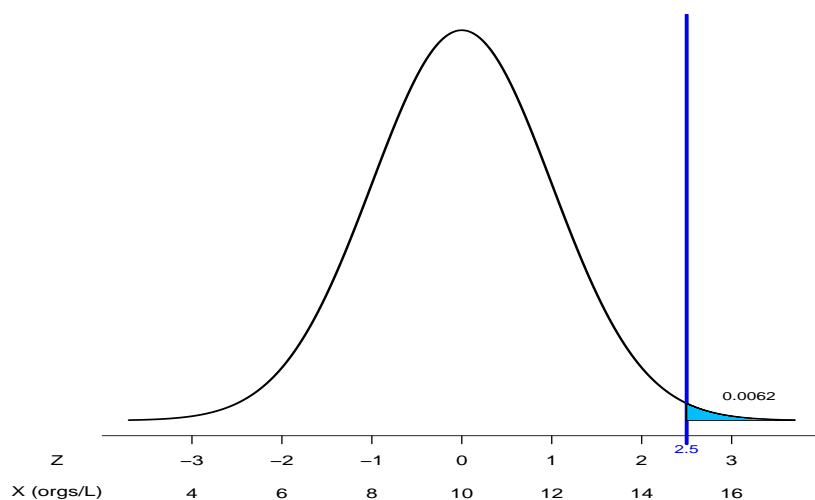
2. (7.14) (p. 153) - Sketch curve

Let X be the coliform level in a site such that $X \sim N(10, 2)$.

The quantity of interest is $\Pr(X > 15)$.

The standardized quantity is $\Pr(Z > \frac{15-10}{\sqrt{2}}) = \Pr(Z > 2.5)$.

The sketch of the probability is



From Table B, $\Pr(Z > 2.5) = 1 - 0.9938 = 0.0062$.

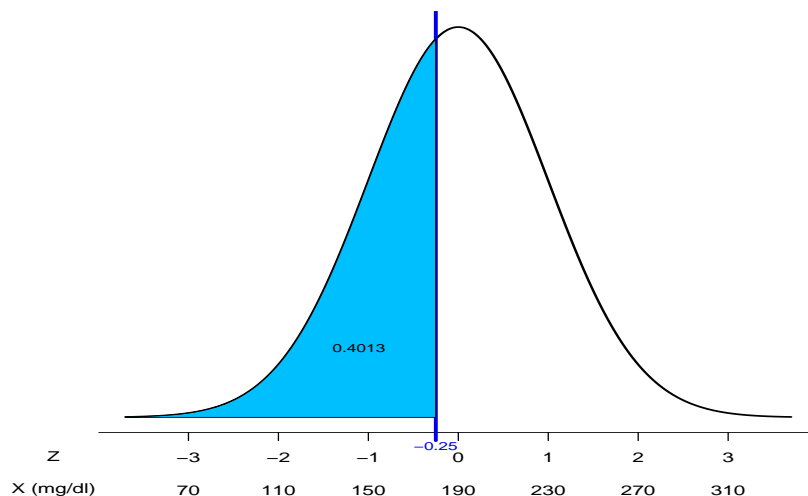
Therefore, there are 0.62% of samples with more than 15 organisms.

3. (8.6) (p. 166) Let X represent the serum cholesterol (mg/dl) in undergraduate men, such that $X \sim N(190, 40)$.

(a) The quantity of interest is $\Pr(X \leq 180)$

The standardized quantity is $\Pr(Z \leq -0.25)$

The sketch of the probability is



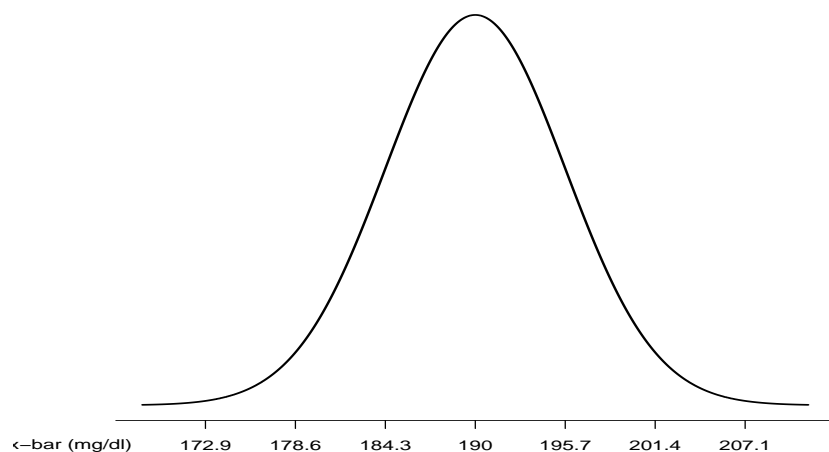
From Table B, $\Pr(Z \leq -0.25) = 0.4013$

Therefore, the probability of randomly selecting an undergraduate man with serum cholesterol less than 180 is 0.4013.

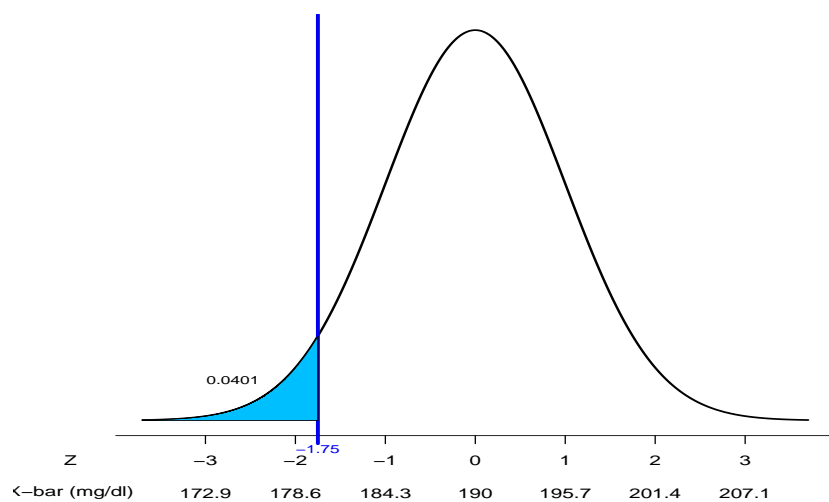
- (b) To obtain the sampling distribution of \bar{x} , first calculate the standard deviation of \bar{x} .

$$\sigma_{\bar{X}} = \frac{40}{\sqrt{49}} = \frac{40}{7} = 5.7143$$

By Chapter 8 results, we know that $\bar{X} \sim N\left(190, \frac{40}{7}\right)$.



- (c) The quantity of interest is $\Pr(\bar{X} \leq 180)$
 The standardized quantity is $\Pr(Z \leq -1.75)$
 The sketch of the probability is

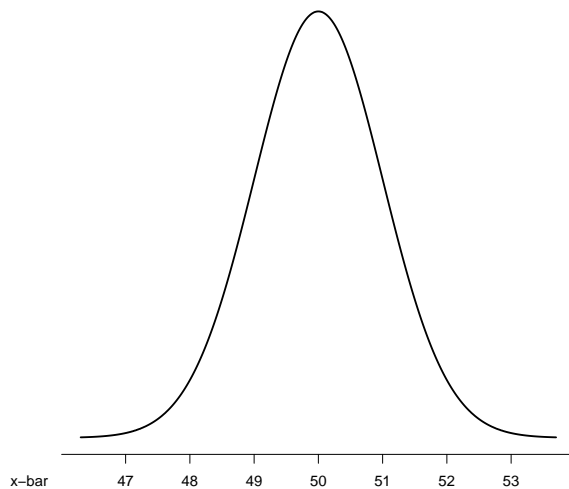


From Table B, $\Pr(Z \leq -1.75) = 0.0401$

Therefore, the probability of getting a sample mean less than 180 is 0.0401.

4. (8.8) (p. 167)

- (a) $\bar{X} \sim N\left(50, \frac{5}{\sqrt{25}}\right) \equiv N\left(50, \frac{5}{5}\right) \equiv N(50, 1)$. That is, the sample mean \bar{X} is distributed Normally with mean $\mu = 50$ and standard deviation $SE_{\bar{X}} = 1$. The inflection points ($\mu \pm \sigma$) are at 49 and 51 and the $\mu \pm 2\sigma$ landmarks are 48 and 52. A sketch of the sampling distribution of \bar{X} :



- (b) Yes, a sample mean of 47 would be surprising because it is $3\sigma_{\bar{x}}$ units below the mean, so it is an unlikely observation.
- (c) A sample mean of 51.5 would not be very surprising, since it is $1.5\sigma_{\bar{x}}$ units to the right of center. This would not be too unusual under the stated conditions.