8. (6% each) A company installs light bulbs, each with an average life of 1000 hours, standard deviation of 50 hours, and distribution approximated by a normal curve. Find the percentage of light bulbs that can be expected to last the period of time.

a. at least 1050 hours?

\[ P(X \geq 1050) = P \left( \frac{X - 1000}{50} \geq \frac{1050 - 1000}{50} \right) \]
\[ = P(Z \geq 1) = .5 - .341 = .159 \]

b. less than 900 hours?

\[ P(X < 900) = P \left( \frac{X - 1000}{50} < \frac{900 - 1000}{50} \right) \]
\[ = P(Z < -2) \]
\[ = .5 - .477 \]
\[ = .023 \] or \[ 2.3\% \]
12 year old blue spruce trees have a mean height of 15 feet with a standard deviation of 2 feet.

a) What percent of these trees will be less than 18 feet tall?

\[ P(X < 18) = P\left( \frac{X - 15}{2} < \frac{18 - 15}{2} \right) = P(2 < 1.5) = 0.5 + 0.433 = 0.933 \text { or } 93.3\% \]

b) What percent of these trees will be between 11 and 19 feet tall?

\[ P(11 \leq X \leq 19) = P\left( \frac{11 - 15}{2} \leq \frac{X - 15}{2} \leq \frac{19 - 15}{2} \right) = P(-2 \leq 2 \leq 2) = 0.477 + 0.477 = 0.954 = 95.4\% \]

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