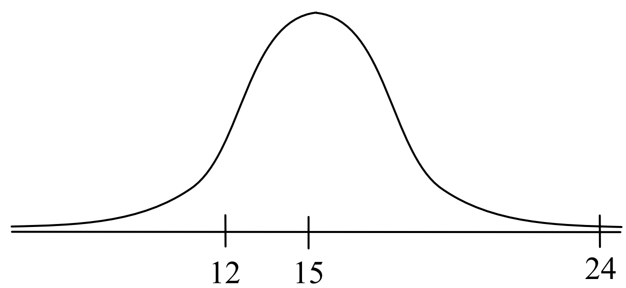
Mth 102 – General Education Statistics – Practice Exam 4 – Solutions

1.



2. $P(Z < 1.53) = 0.9370$

3. $P(Z > -1.2) = 1 - P(Z < -1.2) = 1 - 0.1151 = 0.8849$

4. $P(-1.35 < Z < 2.48) = P(Z < 2.48) - P(Z < -1.35) = 0.9934 - 0.0885 = 0.9049$.

5. $P(Z < 4) \approx 1$, since almost all of the observations are within 3 standard deviations. (And a Z of 4 corresponds to 4 standard deviations.)

6. $Z_{0.025} = 1.96$

7. We want a Z_o such that $P(Z < Z_o) = 0.92$. Using the table, we can see that the Z is between 1.40 and 1.41, so $Z = 1.405$.

8. Let X = exam score. $P(X > 90) = P\left(Z > \frac{90-75}{10}\right) = P(Z > 1.5) = 0.0668$, so about 6.68% of the students received an A.

9. Again, let X = exam score. $P(X < 60) = P\left(Z < \frac{60-75}{10}\right) = P(Z < -1.5) = 0.0668$, so again about 6.68% will not pass.

10. The key here is that 75% of the observations are less than Q_3. From the table, we can see that $P(Z < 0.675) \approx 0.75$. To get Q_3, we use the formula $X = \mu + \sigma Z$: $Q_3 = 75 + 10 \cdot 0.675 = 81.75$, so Q_3 is approximately 82.

11. $P(X \le 18) = P\left(Z \le \frac{18-20.7}{5}\right) = P(Z \le -0.54) = 0.2946$

12. Yes, there is evidence – the normal probability plot is roughly linear.

13. Sampling error is the inherent error in using a sample to estimate something about the population.

14. In this case, we are dealing with a sample, so we need $\mu_{\bar{x}}$ and $\sigma_{\bar{x}}$: $\mu_{\bar{x}} = \mu = 75$ and $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{10}{\sqrt{25}} = \frac{10}{5} = 2$. Then $P(\bar{x} \geq 80) = P\left(Z \geq \frac{80-75}{2}\right) = P(Z \geq 2.5) = 0.0062$.

15. Again, we are dealing with a sample, so we need $\mu_{\bar{x}}$ and $\sigma_{\bar{x}}$: $\mu_{\bar{x}} = \mu = 100$ and $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{16}{\sqrt{20}} \approx 3.58$. Then $P(\bar{x} \geq 106) = P\left(Z \geq \frac{106-100}{3.58}\right) = P(Z \geq 1.68) = 0.0465$.

16. Again, we are dealing with a sample, so we need $\mu_{\bar{x}}$ and $\sigma_{\bar{x}}$: $\mu_{\bar{x}} = \mu = 2.7$ and $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{0.6}{\sqrt{100}} = 0.06$. Then $P(\bar{x} < 2.5) = P\left(Z < \frac{2.5-2.7}{0.06}\right) = P(Z < -3.33) = 0.0004$.