1. Below are survival times (in days) of 13 guinea pigs that were injected with a bacterial infection in a medical study:
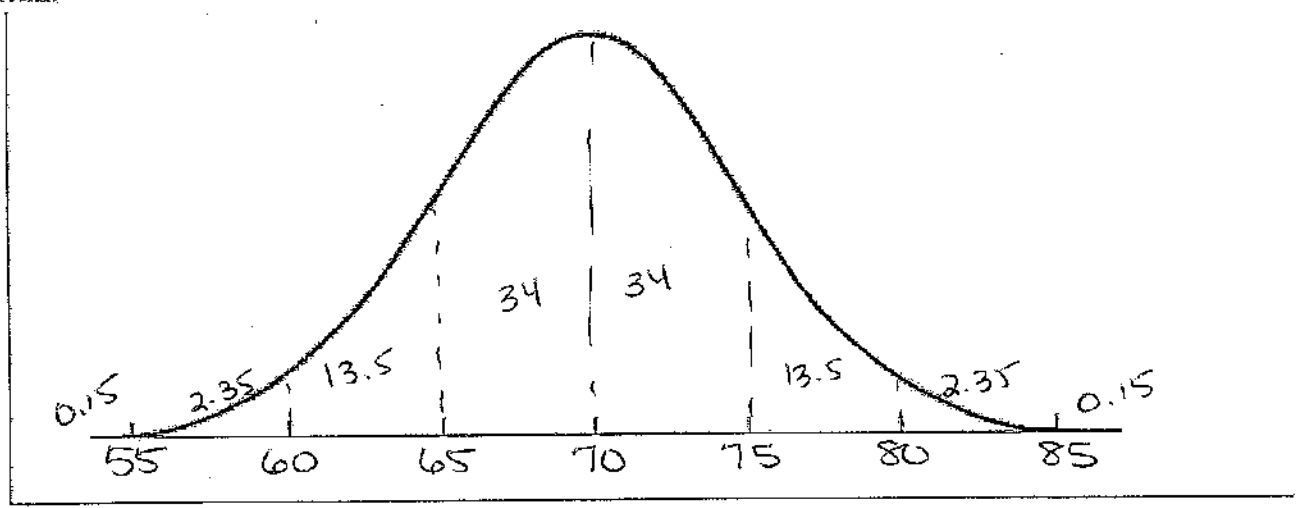
    91   83   84   79   91   93 95 97 97 111 101 105 98

    (a) Find the mean and standard deviation for this data set. $\bar{X} = 94.23$, $S_x = 8.94$

    (b) Find the 5-number summary for this data set. $79, 87.5, 95, 99.5, 111$

    (c) Create a boxplot for this data set AND describe the SHAPE of the distribution of survival times.

    (d) Another set of data from a similar study produced the same mean survival times but the standard deviation was 5.78. Which set of data would be considered MORE RELIABLE? Explain your reasoning.

    c) *(hand-drawn boxplot on number line from 75 to 110)*   fairly symmetric
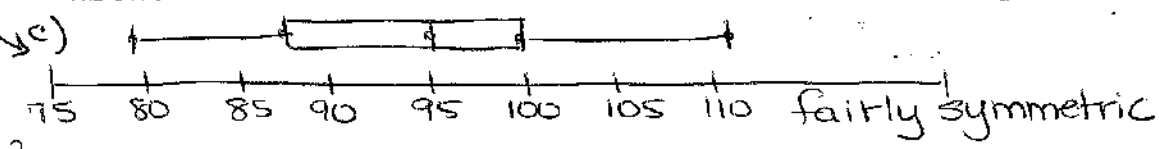
    d) Second set since SD is smaller!

2. 2000 freshmen at State University took a biology test. The scores were distributed normally with a mean of 70 and a standard deviation of 5. Label the mean and three standard deviations from the mean.

    (normal curve labeled with 0.15, 2.35, 13.5, 34, 34, 13.5, 2.35, 0.15 and x-axis values 55, 60, 65, 70, 75, 80, 85)

    a) Using the Empirical Rule, approximately what percent of the freshmen scored between 65 and 80? $34 + 34 + 13.5$ **81.5%**

    b) Using z-scores, approximately what percent of the freshmen score below a 62? $Z = \dfrac{62-70}{5} = -1.6$ → table   0.0548

    c) Using z-scores, approximately what percent of the freshmen scored above 84? $Z = \dfrac{84-70}{5} = 2.8$ $1 - $ table $1 - .9974$ .0026

    d) Using z-scores, approximately what percent of the freshmen scored between 62 and 84?

    $$.9974$$
    $$-.0548$$
    $$\overline{.9426}$$

3. Which sampling method was utilized? Why?

(a) Student organization looking to get signatures for a petition camp out in front of Class of 1950 Lecture Hall.
Convenience sample

(b) Select three students from a class to receive ice cream by putting all the students' names in a hat and picking out three names randomly. *simple random sample*

(c) Select three female students and three male students to receive ice cream by putting all the men's names in one hat and all the women's names in a different hat and picking out three names from each hat.
Stratified random sample

(d) In Fall 1995, the BBC in Britain requested viewers to call the network and indicate their favorite poem.
Voluntary sample

(e) Divide the class into four groups (freshman, sophomore, junior and senior) and take a random sample of two students from each group. *stratified random sample*

(f) Priceline.com randomly e-mails a Customer Satisfaction Survey for certain transactions done on its site in which customers choose to either respond or not.
voluntary sample.

4. Use the formulas below for each question.

$$CI = \bar{x} \pm z^* \cdot \frac{\sigma}{\sqrt{n}} \qquad\qquad CI = \hat{p} \pm z^* \cdot \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

a) You want to rent an unfurnished one-bedroom apartment in Boston next year. The mean monthly rent for a simple random sample of 32 apartments advertised in the local newspaper is $1,400. Assume that the standard deviation is known to be $220.
Find a 99% confidence interval for the mean monthly rent for unfurnished one-bedroom apartments available for rent in this community.

$$1400 \pm 2.575 \cdot \frac{220}{\sqrt{32}} \rightarrow (1299.86, 1500.14)$$

b) Of the 1048 teens surveyed, 189 named Facebook as their favorite social media network. *Give a 90% confidence interval for the proportion of all people in this age group who would choose Facebook as their favorite social media network.*

$$\hat{p} = \frac{189}{1048} = .18 \qquad\qquad .18 \pm 1.645 \cdot \sqrt{\frac{.18(1-.18)}{1048}}$$

$$(.16 , .20)$$

Key

Unit 2

1) Perform each polynomial operation.

a) $(2x^2 + 3x - 7) + (3x^2 - 4x - 10) \longrightarrow 5x^2 - x - 17$

b) $(5x^2 - 12x + 1) - (2x^2 + 3x - 7) \longrightarrow 3x^2 - 15x + 8$

c) $5x^2(-2x^4 + 3y - 6) \longrightarrow -10x^6 + 15x^2y - 30x^2$

d) $(x + 2)(x - 3) \longrightarrow x^2 - x - 6$

e) $(3x + 4)(3x - 4) \longrightarrow 9x^2 - 16$

f) $(2x - 3)(4x^2 - 5x + 1) \longrightarrow 8x^3 - 10x^2 + 2x - 12x^2 + 15x - 3 \longrightarrow 8x^3 - 22x^2 + 17x - 3$

g) $(x^2 - 2x - 15) \div (x + 3) \longrightarrow x - 5 \quad (\text{no remainder})$

h) $\dfrac{-5p + 4p^2 + 4}{p - 2}$

$$p-2 \overline{)\ 4p^2 - 5p + 4} \quad \rightarrow\ 4p + 3 + \frac{10}{p-2}$$
$$\ominus\ 4p^2 - 8p \downarrow$$
$$3p + 4$$
$$\ominus\ 3p - 6$$
$$10_R$$

2) Factor each polynomial.

GCF a) $y^4 - 3y^2 - 2y \quad y(y^3 - 3y - 2)$

GCF b) $20a^5b^3 + 30a^3b^2 - 40a^2b^3 \quad 5a^2b^2(4a^3b + 6a - 8b)$

Diff of Squ. c) $81x^2 - 4 \quad (9x - 2)(9x + 2)$

Diff of Squ. + GCF d) $100a^2 - 225 \quad 25(4a^2 - 9) \rightarrow 25(2a + 3)(2a - 3)$

Tri e) $x^2 + 7x + 12 \quad (x + 4)(x + 3)$

Tri f) $y^2 - 10y + 24 \quad (x - 6)(x - 4)$

Tri g) $2x^2 - 3x - 5 \quad (2x - 5)(x + 1)$

Tri h) $5x^2 - 14x - 3 \quad (5x + 1)(x - 3)$