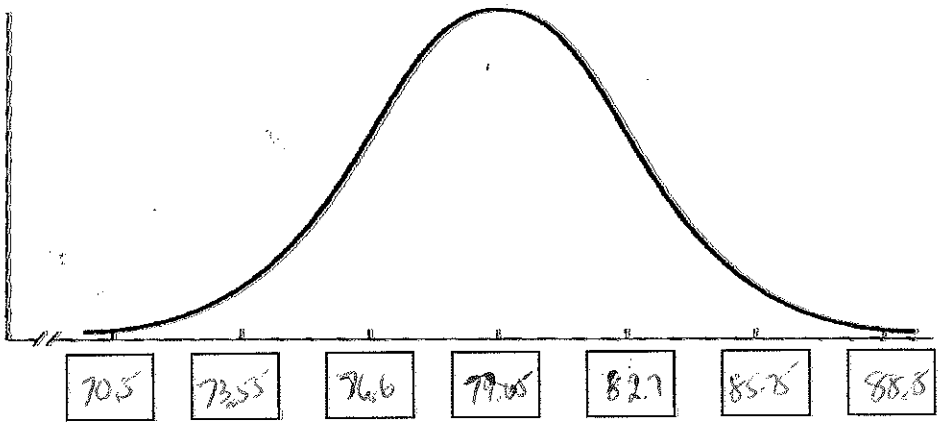
Statistics – 3rd Quarterly Exam Review

Chapter 7 – Normal Distribution

1. Back in the day (1986-87), the average height of all 368 NBA Players was 79.65 inches tall with standard deviation 3.05 inches. Assume that NBA heights are normally distributed.



a. Fill in the boxes of the Normal Curve with the NBA Player information from above.

b. Michael Jordan, the leading scorer in the league, was 6'6". What was his z-score?

$z = \frac{78 - 79.65}{3.05} = -0.54$

c. Magic Johnson, the leader in assists, was 6'9". What was his z-score?

$z = \frac{81 - 79.65}{3.05} = 0.44$

d. What percent of the NBA players were shorter than Michael Jordan?

29.46 %

e. What percent of the NBA players were shorter than Magic Johnson?

67%

f. What percent of the NBA players were taller than Michael Jordan?

70.54%

g. What percent of the NBA players were taller than Magic Johnson?

33%

h. Alvin Robertson led the league in steals. Alvin was taller than about 6.4% of all NBA players. How tall was Alvin?

0.064 → $z = -1.52$

$-1.52 = \frac{x - 79.65}{3.05}$

About 75 inches (6'3")

i. Mark Eaton led the league in blocks. 0.31% of the league was taller than Mark Eaton. How tall was Mark?

$1 - 0.0031 \rightarrow z = 2.74$

0.9969

$2.74 = \frac{x - 79.65}{3.05}$

About 88 inches (7'4")

Chapter 8 – Confidence Intervals

2. Using the NBA player height from above, construct a 90% confidence interval for the height of all NBA players.

$n = 368$
$\bar{x} = 79.65$
$\sigma = 3.05$
$z_{90} = 1.65$

$E = \frac{1.65 \cdot 3.05}{\sqrt{368}} = 0.26$

$(79.39 < \mu < 79.91)$

3. Using the NBA player height from above, construct a 99% confidence interval for the height of all NBA players.

$E = \frac{2.58 \cdot 3.05}{\sqrt{368}} \quad 0.41$

$(79.24 < \mu < 80.06)$

4. Below is a list of the 1988 United States Olympic Men's Basketball team and their heights. Using the Olympic team's heights, construct a 95% confidence interval for all NBA players.

79 William Anderson – 6'7"
80 Stacey Augmon – 6'8"
73 Vernell Coles – 6'1"
77 Jeffrey Grayer – 6'5"
75 Hersey Hawkins – 6'3"
78 Dan Majerle – 6'6"
82 Daniel Manning – 6'10"
81 Herman Reid – 6'9"
77 Mitch Richmond – 6'5"
85 David Robinson – 7'1"
73 Charles Smith – 6'1"
82 Coached by John Thompson – 6'10"

$\bar{x} = 78.5$
$s_x = 3.73$
$n = 12$

$t_{11,95} = 2.201$

$E = \frac{2.201(3.73)}{\sqrt{12}} = 2.37$

$(76.13 < \mu < 80.87)$

5. What do you notice about the confidence intervals in #2, #3, and #4? Try to explain why.

The Sample Size is so big in #2,3 causing the C.I. to be so narrow. n is so ~~small~~ relatively small in #4 causing that C.I. to be super-wide (comparatively).

Mixed Review

For the following questions, use your statistics from #4.

6. In 1988-89, what percent of all NBA players were taller than David Robinson?

$z = \frac{85 - 78.5}{3.73} = 1.74 \longrightarrow 95.91$

$1 - 95.91\% = 4.09\%$

7. In 1988-89, what percent of all NBA players were shorter than Dan Majerle?

$z = \frac{78 - 78.5}{3.73} = -0.13$ or -0.14 $\longrightarrow$ 0.5517 or 0.5557

55.17% or 55.57%

8. In 1988-89, what percent of all NBA players were between the heights of Vernell Coles and Hersey Hawkins?

$\frac{73 - 78.5}{3.73}$ 73

-1.47 -0.94

$0.1736 - 0.0708 = 10.28\%$

9. In 1988-89, which player is in the 45th percentile for height?

$z = -0.13$ $-0.13 = \frac{x - 78.5}{3.73}$ $x = 78$ Dan Majerle

10. In 1988-89, which player is in the 86th percentile for height?

$z = 1.08$ Danny Manning

11. In 1988-89, which player is in the 96th percentile for height?

$z = 1.75$ David Robinson

NCAA Tournament Statistics

Suppose our class' data was a good sample for the entire population and that the data is normally distributed. Use the *Number of Correctly* predicted games to answer the following questions.

12. Mean = 32.95 31.95

13. Median = 33 32

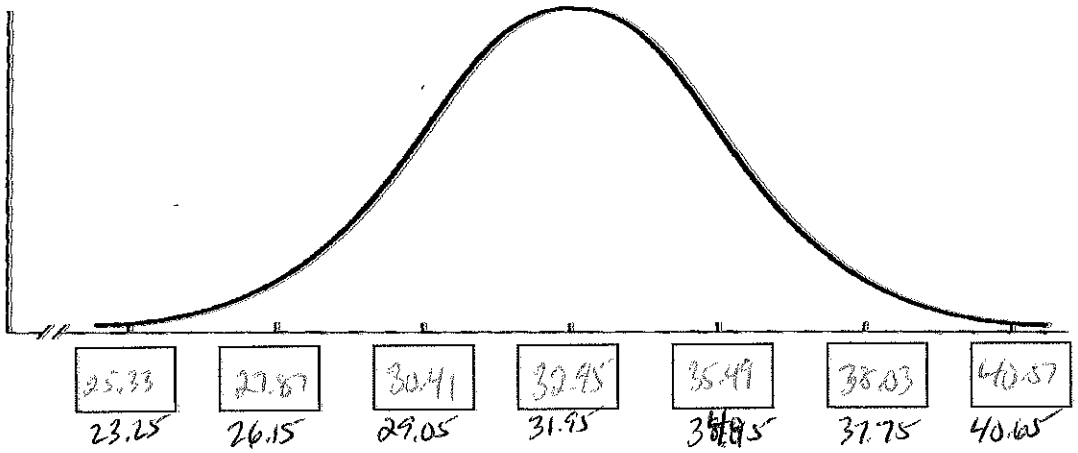
14. Mode = 34 (10) 34(10)

15. Standard Deviation = 2.54 2.90

n=42

n=47

16. Fill in the Normal Curve.



17. What is your z-score? -1.56 -1.02 $\frac{29-32.95}{2.54}$

18. In what percentile are you? 6th 15th

19. Overall, the best CBS bracket has 44 correct. What is that dude's z-score and percentile?

$\frac{44-32.95}{2.54} = 4.35$ 100th Percentile $\frac{44-31.95}{2.9} = 4.16$

20. Strangely, there were a few brackets on CBS that got 0 (yes, zero) correct. What's their z-score?

$\frac{0-32.95}{2.54} = -12.97$ 0th Percentile 11.02

21. Using our class' statistics, construct a 98% confidence interval for the number of correctly predicted games for all brackets?

n=42 σ=2.54
$\bar{x}$=32.95
z_{98}=2.33

$E = \frac{2.33(2.54)}{\sqrt{42}} = 0.91$

(32.04 < μ < 33.86)

(30.91 < μ < 32.99)

n=47
$\bar{x}$=31.95
σ=2.9
z_{98}=2.33

$E = \frac{2.33(2.9)}{\sqrt{47}} = 1.04$