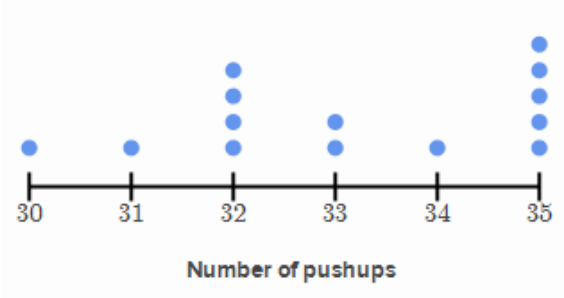
Unit 3 Review #1 Name: _____ Date: _____

Section I – Percentiles

Use the dot plot below to answer the questions.



1. Joseph could do 33 pushups in a minute. What is their percentile?

2. Patricia could do 31 pushups in a minute. What is their percentile?

3. Roderick could do 35 pushups in a minute. What is their percentile?

Section II – Solve for Z-Scores

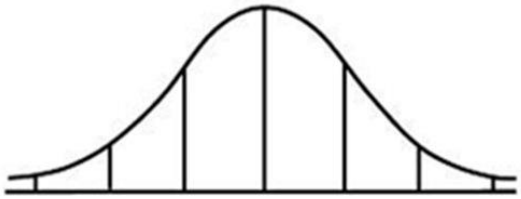
4. Layla scored a 65 on her Spanish final exam. What was her z-score if the average on the test was a 69 and the standard deviation was 4?

5. Gabriela scored a 76 on her Statistics final exam. What was her z-score if the average on the test was an 84 and the standard deviation was 7?

6. Between Layla and Gabriela, who did relatively better on their final exam? Why?

Section III – Empirical Rule

7. The Unit 2 Statistics test had an average of 65 after 55 students took the test. Label the normal distribution if the $\sigma = 5.5$.



a. What percentage of scores were between 59.5 and 70.5?

b. What percentage of scores were outside of 48.5 and 81.5?

c. What percentage of scores were less than 59.5?

d. What percentage of scores were between 59.5 and 81.5?

e. What percentage of scores were between 48.5 and 59.5?

f. What percentage of scores were between 65 and 76?

g. **How many** students made below a 65?

h. **How many** students made above an 81.5?

i. What score separated the top 16%?

j. What score separated the bottom 2.5%?

Section IV – Using the Z-table (Easy)

For the numbers below, find the percentile rank (two decimal places) (percent of individuals scoring **BELOW**):

8. z = 0.24

9. z = -1.25

10. z = 0.08

11. z = -0.47

12. z = 3.2

13. z = -2.3

14. A fifth grader takes a standardized achievement test ($\mu = 125$ and $\sigma = 15$) and scores a 133. What is the child's percentile rank?

Section V – Using the Z-table (Medium)

For the numbers below, find the percent of cases falling **ABOVE** the z-score:

15. z = 0.24

16. z = -1.25

17. z = 0.08

18. A patient recently diagnosed with Alzheimer's disease takes a cognitive ability test and scores a 51. The mean on the test is 52 and has a standard deviation of 5. What percentage of people scored **higher** on the cognitive test?

For the numbers below, find the percent of cases falling **BETWEEN** the z-score:

19. -0.32 < z < -0.23

20. 0.03 < z < 2.7

21. -1.4 < z < 1.84

22. Pat and Chris both took a spatial abilities test (mean = 80, std. dev. = 8). Pat scores a 76 and Chris scored a 94. What percent of individuals scored between Pat and Chris?

23. The Welcher Adult Intelligence Test Scale is composed of a number of subtests. On one subtest, the raw scores have a mean of 35 and a standard deviation of 6. Assuming these raw scores form a normal distribution:

    a. What is the probability of getting a raw score between 28 and 38?

    b. What is the probability of getting a raw score between 41 and 44?

Section VI – Using the Z-Table Reverse

24. Find the z-score that gives a probability of 0.2810.

25. Find the z-score that give the area above 0.1515.

26. For a normal distribution, find the z-score that separates the distribution as follows:

    a. Separate the **highest** 27% from the rest of the distribution.

    b. Separate the **lowest** 42% from the rest of the distribution.

    c. Separate the **highest** 70% from the rest of the distribution.

    d. Separate the **lowest** 89% from the rest of the distribution.

Section VII – Solving for the observation (x-value) HINT: Z is given, set up equation and solve for x.

27. Sam took the ACT and his score was one standard deviation (z=1) above the average. If the ACT has a mean of 20.8 and a standard deviation of 4.8, what was Sam's score?

28. Jimmy took the SAT and his Math section score was two standard deviations below (z=-2) the average. If the Math section of the SAT has an average of 533 and a standard deviation of 100, what was Jimmy's math section score?

Section VIII – Solving for the observation (x-value) HINT: Use the table first to find the z-score, then solve for x.

29. The Welcher Adult Intelligence Test Scale is composed of a number of subtests. On one subtest, the raw scores have a mean of 35 and a standard deviation of 6. Assuming these raw scores form a normal distribution:

    a) What number represents the 70th percentile (what number separates the lower 70% of the distribution)?

    b) What number represents the 99.83rd percentile?

30. Scores on the SAT form a normal distribution with $\mu = 500$ and $\sigma = 100$.
    a) What is the minimum score necessary to be in the **bottom** 17% of the SAT distribution?

    b) Find the range of values that defines the **top** 40% of the distribution of SAT scores.

31. If a math test scores were normally distributed with a mean of 81 and a standard deviation of 5, what score is in the 90^{th} percentile?

32. If a Math test scores were normally distributed with a mean of 79 and a standard deviation of 7, what score is in the 23^{rd} percentile?

33. If a Biology test scores were normally distributed with a mean of 67 and standard deviation of 3, what score had a probability of 89.44%?

34. If a factory created bolts that lengths followed a normally distribution with a mean of 3.5 inches and a standard deviation of 0.2 inches, what bolt length would be in the **bottom** 0.41%?

35. Matthew scored in the 94.52^{nd} percentile on his IQ test which has an average of 110 and $\sigma = 20$. What did he score on his IQ test?