Wednesday 2/26/20

1. Take out HW, 20 min. to finish

2. HW Review

3. ALL Types Practice

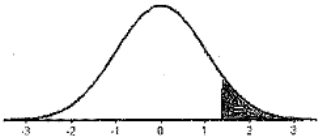
Statistical Reasoning
Normal Table Extra Practice

Name: _____

Use the z-score and normal table to calculate percentage. Round all z-scores and final answers to 2 decimal places. Circle your final answer. You must show all of your work.

1) Find the probability using the z-score and normal table. Shade the appropriate area under the normal curve for each.

a) $1.41 < z < 2.8$



$0.9207 - 0.9974 = 0.0767$

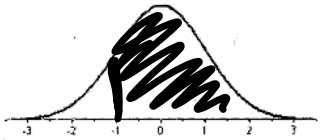
7.67%

b) $z < 2.27$

0.9884

98.84%

c) $z > -0.71$



$1 - 0.2389 = 0.7611$

76.11%

d) $-1.21 < z < 0.55$

$0.7088 - 0.1131 = 0.5957$

59.57%

e) $-0.67 < z < -0.1$

$0.4602 - 0.2514 = 0.2088$

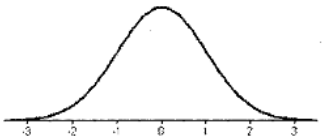
20.88%

f) $z > 1.15$

$1 - 0.8749 = 0.1251$

12.51%

g) $-0.56 < z < 2.08$



$0.9812 - 0.2877 = 0.6935$

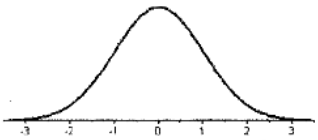
69.35%

h) $z < -2.55$

0.0054

0.54%

i) $z > 0.75$



$1 - 0.7734 = 0.2266$

22.66%

j) $-2.87 < z < 0.09$

$0.5359 - 0.0021 = 0.5338$

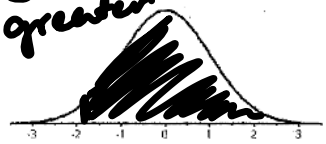
53.38%

k) $z < 0.57$

0.7157

71.57%

l) $z > -1.66$ greater



$1 - 0.0485 = 0.9515$

95.15%

Use the z-score and normal table to calculate percentage. Round all z-scores and final answers to 2 decimal places. Circle your final answer. You must show all of your work. Check your work using a calculator.

2) Test grades on the unit 1 statistics test are approximately normal with a mean of 80 and a standard deviation of 8.

a. What percent of test grades are **between** 81 and 97?

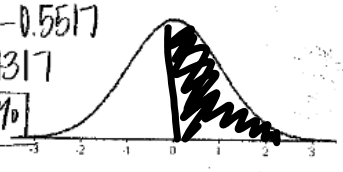
$Z=\frac{81-80}{8}=0.13$ Tbl=0.5517

$Z=\frac{97-80}{8}=2.13$ Tbl=0.9834

0.9834−0.5517

0.4317

43.17%



b. What percent of test grades are **more than** 77?

$Z=\frac{77-80}{8}=-0.38$ Tbl=0.3520

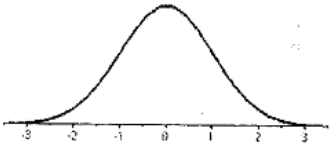
1−0.3520=0.6480

64.8%

c. What percent of test grades are **less than** 90?

$Z=\frac{90-80}{8}=1.25$ Tbl=0.8944

89.44%



d. If there are 182 seniors who took this exam, around **how many** will score less than a 90?

0.8944(182)=162.8

% (TOSS) 163 seniors

3) During peak season, wait time for a roller coaster at Six Flags follows a normal distribution with an average of 64 minutes and a standard deviation of 3 minutes.

a. What percent of wait times are **between** 55 and 65 minutes?

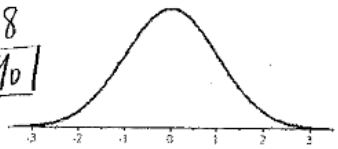
$Z=\frac{55-64}{3}=-3$ Tbl=0.0013

$Z=\frac{65-64}{3}=0.33$ Tbl=0.6293

0.6293−0.0013

0.628

62.8%

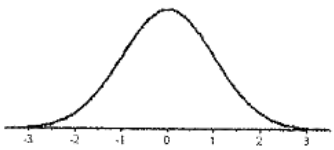


b. What percent of wait times are **more than** 70 minutes?

$Z=\frac{70-64}{3}=2$ Tbl=0.9772

1−0.9772=0.0228

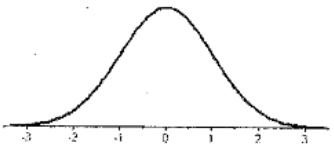
2.28%



c. What percent of wait times are **less than** 60 minutes?

$Z=\frac{60-64}{3}=-1.33$ Tbl=0.0918

9.18%



d. If there are 250 people in line, around **how many** will wait less than 60 minutes?

0.0918(250)=22.95 23 people

Statistical Reasoning Name _____
Unit 3 –Normal Standard Table #3

Finding the Z-Score

1. The z-score that corresponds to an area of 0.8888.

P

$Z = 1.22$

2. The z-score that corresponds to 0.4090 of the distribution's area to its right.

P

$1 - 0.4090 = 0.5910$ $Z = 0.23$

3. For a normal distribution, find the z-score that separates the distribution as follows:
   a) Separate the highest 30% from the rest of the distribution.

P

$1 - 0.30 = 0.7000$ $Z = 0.52$

   b) Separate the lowest 40% from the rest of the distribution.

0.40 $Z = -0.25$

   c) Separate the highest 75% from the rest of the distribution.

$1 - 0.75 = 0.25$ $Z = -0.67$

Solving for Values

4. 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 65th percentile (what number separates the lower 65% of the distribution)?

X P(less)

$P = .6500$ → $Z = 0.39$ $0.39 = \frac{X - 35}{6}$ $2.34 = X - 35$ $X = 37.34$

   b) What number represents the 90th percentile?

$Z = 1.28$ $1.28 = \frac{X - 35}{6}$ $7.68 = X - 35$ $X = 42.68$

5. Rachel wonders how much television kids watch these days. She figures children television usage in a day is normally distributed with a mean of 2 hours and a standard deviation of 0.3 hours.

   a) What is the range for the bottom 19% of children television usage?

X ? 0.19

$P = 0.1900$ $Z = -0.88$ $-0.88 = \frac{X - 2}{0.3}$ $-0.264 = X - 2$ $X = 1.74$ hours

   b) What is the range for the top 24% of children television usage?

$1 - 0.24 = 0.7600$ $Z = 0.71$ $0.71 = \frac{X - 2}{0.3}$ $0.213 = X - 2$ $X = 2.21$ hours

6. Scores for the California Police Officer Standards and Training test are normally distributed, with a mean of 50 and a standard deviation of 10.

a) An agency will only hire applicants with scores in the top 10%. What is the lowest score you can earn and still be eligible to be hired by the agency?

P x

$1-0.1=0.9000$ $1.28=\frac{X-50}{10}$ $12.8=X-50$

$Z=1.28$ $X=62.8$

b) Those officers scoring below the 20th percentile are sent to undergo additional training. What is the minimum score needed to avoid this training?

P

$Z=-0.84$ $-0.84=\frac{X-50}{10}$ $-8.4=X-50$

$X=41.6$

7. The length of time employees have worked at a particular company is normally distributed with mean 11.2 years and standard deviation 2.1 years.

a) If the lowest 10% of employees are to be laid-off in a cutback, what is the maximum length of time that an employee could have worked and still be laid off?

$Z=-1.28$ $-1.28=\frac{X-11.2}{2.1}$ $-2.688=X-11.2$

$X=8.512$

8.5 years

b) If the highest 10% of employees are to be promoted, what is the minimum length of time that an employee could have worked and still be promoted?

$Z=1.28$ $1.28=\frac{X-11.2}{2.1}$ $2.688=X-11.2$

$X=13.888$

13.9 years

Sx, $\bar{x}$ = σ, μ

8. 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 top 15% of the SAT distribution?

$1-0.15=0.85$ $1.08=\frac{X-500}{100}$ $108=X-500$

$Z=1.08$ $X=608$

b) Find the z-scores that define the middle 80% of the distribution of SAT scores (372 and 628).

$Z=\frac{372-500}{100}=-1.28$ $Z=\frac{628-500}{100}=1.28$

97.44th Perce.

P = .9744 $1.95=\frac{X-500}{100}$

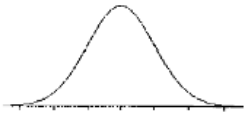
Z = 1.95 695 = X

STA 2e: Sect. 3.2 Worksheet #2 **Name** _____
NORMAL DISTRIBUTIONS

FINDING A PERCENT/PROPORTION given an x value	FINDING AN X VALUE given a percentage/proportion
Standardize x to restate the problem in terms of a standard Normal variable z. Draw a picture to show the area of interest under the standard Normal curve. Then find the required area under the standard Normal curve using Table A.	Look in the body of Table A for the entry closest to the given proportion or the proportion to the left of given proportion to find the corresponding z. *"Unstandardize"* to transform the solution from a z-score to a value of x using the equation $z = \frac{x - \mu}{\sigma}$.

Scores on the Wechsler Adult Intelligence Scale, a standard IQ test, are approximately normal for the 20 to 34 age group with $\mu = 110$ and $\sigma = 25$.

1. What percent of this age group have an IQ less than 100?



2. What percent of this age group have an IQ between 90 and115?

3. Find the 80th percentile of the IQ scores distribution of 20 to 34 year olds.

4. Find the IQ score which separates the lowest 25% of all IQ scores for this age group.

The adult men of the Dinaric Alps have the highest average height of all regions. The distribution of height is approximately normal with a mean height of 6 ft 1 in (73 inches) and standard deviation of 3 inches.

5. Find the 40th percentile of the height of Dinaric Alps distribution for men.

6. What percentage of men have a height greater than 74 inches?

Sect. 3.2 Worksheet #2 p.2

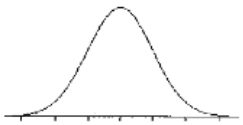
7. What percentage of men have a height between 70 inches and 78 inches?

8. The average height of adult American men is 69 inches. What percent of the adult men in the Dinaric Alps are taller than the average American man?

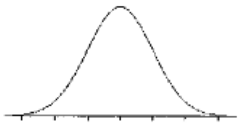
9. What would be the minimum height of man in the Dinaric Alps that would place him in the top 10% of all heights?

The length of pregnancy for the Asian elephant has an approximately normal distribution with an average length of 609 days and standard deviation of 31 days.

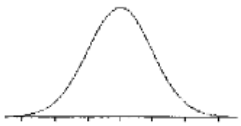
10. How long do the longest 5% of all elephant pregnancies last?



11. What percent of the elephant pregnancies last between 600 and 615 days?



12. The shortest 20% of all elephant pregnancies last fewer than how many days?



13. The lowest 60% of all elephant pregnancies fall at how many days?