Semester 1 Practice Final 3

KEY

Chapter 2

1. In a standard normal distribution, what proportion of values are above 0.8?

   a. 0.25

   b. 0.16

   c. 0.788

   d. 0.212

   e. 0.68

↳ 0.8 STANDARD DEVIATIONS

* FROM STANDARD NORMAL TABLE:

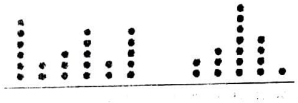
.80 → .78814 ← AREA TO THE LEFT OF THE Z SCORE

SO, 1 − .78814 = .21186 ← TO THE RIGHT

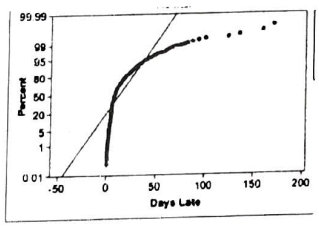
2. Which of the following data sets could be normally distributed?

   a. The length of a commuter's daily travel, with a mean of 14 minutes and a median of 12.

↳ NO, MEAN DOESN'T = MEDIAN

   b. This dotplot: 

NO, NOT STANDARD NORMAL

   c. This normal probability plot: 

NO, RIGHT SKEWED

   d. A test where a student in the 84th percentile scored 76%, given that the mean is 64% and the standard deviation is 12%

   e. The weights of newly hatched birds, whose distribution is heavily skewed right.

NO, SKEWED.

76% IS 1 STANDARD DEVIATION RIGHT OF MEAN.

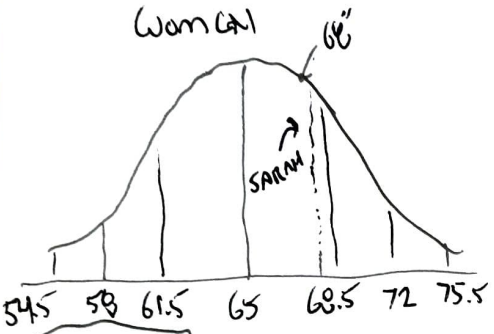
FROM STANDARD NORMAL TABLE, ...

Z = 1.00 → .84134

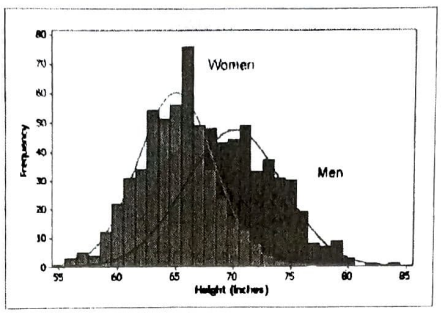
84.1%

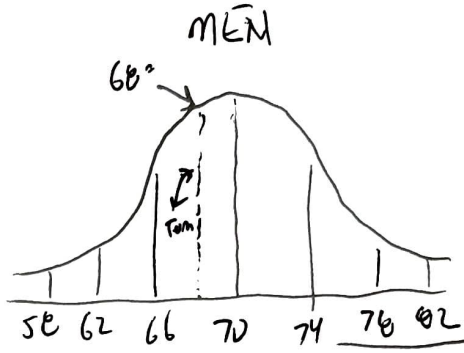
PERFECT EXAMPLE

1. The following histogram shows heights for men and women. Average height for men is 70 inches with a standard deviation of 4. Average height for women is 65 inches with a standard deviation of 3.5 inches.



$\mu = 65$
$\sigma = 3.5$





$\mu = 70$
$\sigma = 4$

a. Sarah and Tom are both 68 inches tall. What are their z-scores?

SARAH: $\hat{Z} = \frac{X-\mu}{\sigma} = \frac{68-65}{3.5} = \frac{3}{3.5} = .8571$

TOM: $Z = \frac{68-70}{4} = \frac{-2}{4} = -.5000$

b. What percentiles do Sarah and Tom fall into?

STANDARD NORMAL TABLE

SARAH: $Z = .8571 \approx .85 \longrightarrow$ TABLE 2 $.80234 =$ 80TH PERCENTILE

TOM: $Z = -.5 \longrightarrow$ TABLE 2 $.30854 =$ 30TH PERCENTILE

c. Who is taller for their gender? Explain.

SARAH IS. SHE IS IN THE 80TH PERCENTILE FOR WOMEN
TOM IS IN THE 30TH PERCENTILE

d. If the doctors who created the above data set did not measure correctly, and accidentally reported heights that were two inches taller than accurate, what would the real means and standard deviations of the data be?

* MEANS = 67 FOR WOMEN, 72 FOR MEN.
* STANDARD DEVIATIONS: NO CHANGE.

2. A recent test taken by a math class had a mean score of 84 and a standard deviation of 8.5.

a. What would a student have to score to be in the 90th percentile or higher?

$\mu = 84$ $\sigma = 8.5$ $X = ?$ $Z = 1.29$ FROM TABLE $.90147 = Z = 1.29$

$Z = \frac{X-\mu}{\sigma}$ $1.29 = \frac{X-84}{8.5}$ $X = 94.97$

→ MULTIPLY BY 8.5, ADD 84 → SO, NEEDS A 95%.

b. What proportion of the students scored below a 75%?

$$z = \frac{x - \mu}{\sigma}$$

$$z = \frac{75 - 84}{8.5}$$

$$z = -1.058$$

$\rightarrow$ TABLE $= .1486$

$\downarrow$

14.7% OF STUDENTS SCORED BELOW 75%