

6 - NORMAL DISTRIBUTION BY HAND

NAME Key Spring 16

Convert the following z-scores into proportions:

1. $z = -1.25$

2. $z = 3.01$

3. $z = -0.82$

4. $z = 0.07$

5. $z = -3.39$

$.1056$

$.9987$

$.2061$

$.5219$

$.0003$

Convert the following proportions into z-scores:

bottom 30%

7. Top 13%

8. Bottom 5%

9. Top 33%
*look for .67

10. Bottom 18%

$-.52$

*look for .87

1.13

-1.645

0.44

$-.92$

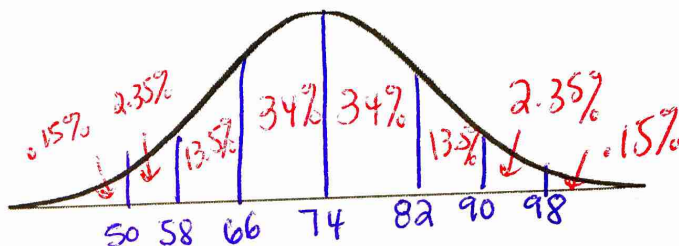
11. The results of an AFM test are normally distributed with a mean of 74 and a standard deviation of 8. Find the following:

a. Draw a normal distribution curve. Fill in your percents based on the empirical rule.

b. Find the % of students who made below a 60.

$\frac{60-74}{8} = -1.75$

$.0401$
 $\sim 4.1\%$



c. Find the % of students who made over a 92

$\frac{92-74}{8} = 2.25$ look up on table $\rightarrow .9878$

$1 - .9878 = .0122 \sim 1.22\%$

d. Find the % of students who made between a 70 and 79

$z = \frac{70-74}{8} = -.5$
 \downarrow
 $.3085$

$z = \frac{79-74}{8} = .625$
 \downarrow
 $.63$
 \downarrow
 $.7357$

$.7357 - .3085 = .4272$
 $\sim 42.72\%$

e. If 65 students took the test, how many made above an 80?

$z = \frac{80-74}{8} = .75 \rightarrow .7734$

$1 - .7734 = .2266$

$(.2266)(65) = 14.729 \sim 15$ students

f. What grade do you need to be in the top 20% of the class?

*look in table for .80
closest value = .7995 $\rightarrow z = 0.84$

$.84 = \frac{x-74}{8}$

$6.72 = x - 74$

$x = 80.72$

g. What is the max grade needed to fall in the bottom 25%?

*look in table for .25

closest value: .2514 $\rightarrow z = -0.67$

$-0.67 = \frac{x-74}{8}$

$-5.36 = x - 74$

$x = 68.64$

h. What grade do you need to be in the top 5%?

*look in table for .95

split between 2 values: .9495 | .9505

$z = 1.645$

$1.645 = \frac{x-74}{8}$

$13.16 = x - 74$

$x = 87.16$

2. The average number of times a person has been on a plane is 16 with a st. dev. of 3. Find the following.

a. Draw a normal distribution curve. Fill in your percents based on the empirical rule.

b. Find the % of people who have been on a plane less than 9 times.

$$z = \frac{9-16}{3} = -2.33 \quad \text{look @ table}$$

$$\downarrow$$

$$\boxed{.0099 \quad \text{or } .99\%}$$

c. % of people who have been on a plane over 22 times.

$$z = \frac{22-16}{3} = 2 \quad \text{look @ table}$$

$$\downarrow$$

$$.9772$$

$$1 - .9772 = .0228$$

$$\boxed{2.28\%}$$

d. % between 12 and 18 times on a plane.

$$z = \frac{12-16}{3} = -1.33$$

$$\downarrow$$

$$.0918$$

$$z = \frac{18-16}{3} = .67$$

$$\downarrow$$

$$.7486$$

$$.7486 - .0918 = .6568 \quad \boxed{65.68\%}$$

e. Find max # of times to be in bottom 10%

look @ table for .10

closest value = .1003 $\rightarrow z = -1.28$

$$-1.28 = \frac{x-16}{3}$$

$$-3.84 = x-16$$

$$x = 12.16 \quad \boxed{\sim 12 \text{ times}}$$

f. % of people less than 6 times on a plane

$$z = \frac{6-16}{3}$$

$$z = -3.33 \rightarrow \boxed{.0004 \quad .04\%}$$

g. Min # of times to be in top 35%

look @ table for .65

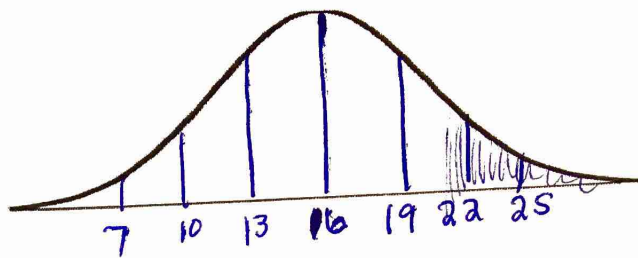
closest value = .6517 $\rightarrow z = .39$

$$.39 = \frac{x-16}{3}$$

$$1.17 = x-16$$

$$x = 17.17$$

$$\boxed{\sim 17 \text{ times}}$$



h. % between 8 and 15 times on a plane.

$$z = \frac{8-16}{3}$$

$$z = \frac{15-16}{3}$$

$$z = -2.67$$

$$z = -.33$$

$$\downarrow$$

$$.0038$$

$$\downarrow$$

$$.3707$$

i. If this was from a survey of FVHS seniors, how many seniors have been on a plane more than 20 times?

assume there are 400 seniors

$$z = \frac{20-16}{3}$$

$$1 - .9082$$

$$z = 1.33$$

$$.0918$$

$$\downarrow$$

$$.9082$$

$$(.0918)(400) = 36.72$$

$$.3707 - .0038$$

$$.3669$$

$$\boxed{36.69\%}$$

$$\sim 37 \text{ seniors}$$

j. Find min # of times to be in top 18%

look @ table for .82

closest value = .8212 $\rightarrow z = 0.92$

$$0.92 = \frac{x-16}{3}$$

$$2.76 = x-16$$

$$x = 18.76$$

$$\boxed{\sim 19 \text{ times}}$$

k. % of people more than 19 times on a plane

$$z = \frac{19-16}{3}$$

$$z = 1 \rightarrow .8413$$

$$1 - .8413 = .1587$$

$$\boxed{15.87\%}$$

l. Find max # of times to be in bottom 5%

look at table for .05

split between two values: .0505 | .0495

$$z = -1.645$$

$$-1.645 = \frac{x-16}{3}$$

$$x = 11.065$$

$$-4.935 = x-16$$

$$\boxed{\sim 11 \text{ times}}$$