

Name TEACHER

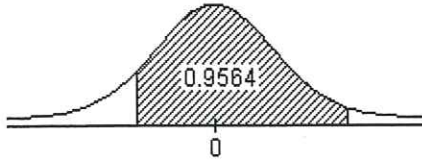


SHORT ANSWER/ PROBLEM SOLVING. Be sure to explain reasoning where necessary

Solve the problem.

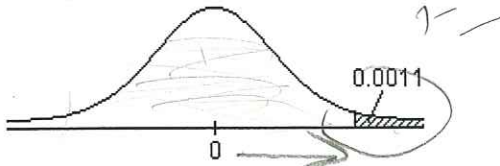
- 1) Find the z-score that corresponds to the given area under the standard normal curve.

1) $z = +1.71$



- 2) Find the z-score that corresponds to the given area under the standard normal curve.

2) $z = 3.07$



Handwritten notes: 'a' with an arrow pointing to the curve, and '0.6' written vertically.



- 3) For the standard normal curve, find the z-score that corresponds to the 7th decile.
- 4) Use a standard normal table to find the z-score that corresponds to the 98th percentile.
- 5) Compare the scores: a score of 75 on a test with a mean of 65 and a standard deviation of 8 and a score of 75 on a test with a mean of 70 and a standard deviation of 4.
- 6) SAT scores have a mean of 1026 and a standard deviation of 209. ACT scores have a mean of 20.8 and a standard deviation of 4.8. A student takes both tests and scores 860 on the SAT and 16 on the ACT. Compare the scores.
- 7) The times for completing one circuit of a bicycle course are normally distributed with a mean of 76.6 minutes and a standard deviation of 4.4 minutes. An association wants to sponsor a race but only wants the top 25% of riders included. In a trial run, what should be the cutoff time?
- 8) In a certain normal distribution, find the standard deviation σ when $\mu = 50$ and 10.56% of the area lies to the right of 55.
- 9) The lengths of pregnancies are normally distributed with a mean of 266 days and a standard deviation of 25 days. If 100 women are randomly selected, find the probability that they have a mean pregnancy between 266 days and 268 days.
- 10) The body temperatures of adults are normally distributed with a mean of 98.6° F and a standard deviation of 0.60° F. If 25 adults are randomly selected, find the probability that their mean body temperature is less than 99° F.

- 3) .53
- 4) 2.055
- 5) same statistically
- 6) 860
- 7) 79.57
- 8) 4
- 9) $\frac{10318}{2881}$
- 10) .9996

$$\frac{4.8}{\sqrt{36}} = .8$$

- 11) Assume that blood pressure readings are normally distributed with a mean of 116 and a standard deviation of 4.8. If 36 people are randomly selected, find the probability that their mean blood pressure will be less than 118.

11) .9938

$$\text{normalcdf}(-20, 118, 116, .8) =$$

- 12) A coffee machine dispenses normally distributed amounts of coffee with a mean of 12 ounces and a standard deviation of 0.2 ounce. If a sample of 9 cups is selected, find the probability that the mean of the sample will be less than 12.1 ounces.

12) .9332

$$\text{normalcdf}(-20, 12.1, 12, \frac{.2}{\sqrt{9}})$$

- 13) A soda machine dispenses normally distributed amounts of soda with a mean of 20 ounces and a standard deviation of 0.2 ounce. Are you more likely to randomly select one bottle with an amount between 19.8 ounces and 20.2 ounces or are you more likely to select a sample of eight bottles with a mean amount between 19.8 ounces and 20.2 ounces? Explain.

13) 8 Bottles

compare - reg vs mean $\frac{SD}{\sqrt{n}}$ $\frac{.2}{\sqrt{8}} = .071$

$$\text{normcdf}(19.8, 20.2, 20, .2)$$

.683

$$\text{normcdf}(19.8, 20.2, 20, .071)$$

.995

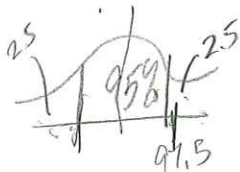
Suppose that you have a sample of 100 values from a population with mean $\mu = 500$ and with standard deviation $\sigma = 80$.

- What is the probability that the sample mean will be in the interval (490, 510)?
- Give an interval that covers the middle 95% of the distribution of the sample mean.

$$\frac{80}{\sqrt{100}} = \frac{80}{10} = 8$$

(490, 510, 500, 8) normcdf

.7887



$$\pm 1.96 = z$$

$$\frac{x - 500}{8} = \pm 1.96$$

515
OR
484

(484, 515)

A telephone company has determined that during nonholidays the number of phone calls that pass through the main branch office each hour follows the normal distribution with mean $\mu = 80000$ and standard deviation $\sigma = 35000$. Suppose that a random sample of 60 nonholiday hours is selected and the sample mean \bar{x} of the incoming phone calls is computed.

- Describe the distribution of \bar{x} .

$$st. dev. = \frac{35000}{\sqrt{60}} = 451.8$$

- Find the probability that the sample mean \bar{x} of the incoming phone calls for these 60 hours is larger than 91970.

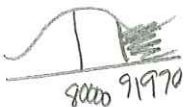
$$z = \frac{91970 - 80000}{451.8}$$

\Rightarrow normal cdf (91970, 100000, 80000, 451.8)

.3
z=0

- Is it more likely that the sample average \bar{x} will be greater than 75000 hours, or that one hour's incoming calls will be?

1333.3
583.3



skip

The amount of mineral water consumed by a person per day on the job is normally distributed with mean 19 ounces and standard deviation 5 ounces. A company supplies its employees with 2000 ounces of mineral water daily. The company has 100 employees. 20 pp

- Find the probability that the mineral water supplied by the company will not satisfy the water demanded by its employees.

$$57.996 - P$$

<19

- Find the probability that in the next 4 days the company will not satisfy the water demanded by its employees on at least 1 of these 4 days. Assume that the amount of mineral water consumed by the employees of the company is independent from day to day.

1, 2 or 3, or 4

- Find the probability that during the next year (365 days) the company will not satisfy the water demanded by its employees on more than 15 days.

skip

$$x \geq 15$$

.57

0.296

Problem 2

A random sample of size $n = 100$ is selected from a distribution with mean $\mu = 16$ and standard deviation $\sigma = 4$. Which one of the graphs below represents the distribution of the sample mean. Please explain your answer.

$\frac{4}{\sqrt{100}} = 0.4$ ST. Error

