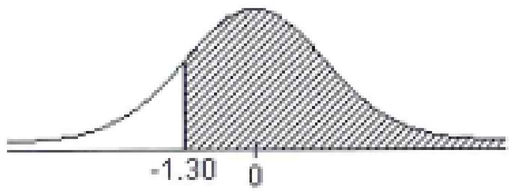
Week 04 Quiz

Problem 1

Find the area of the indicated region under the standard normal curve?

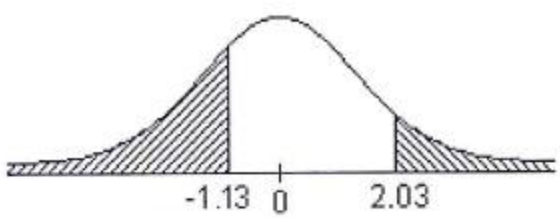


A) 0.9177
B) 0.0968
C) 0.0823
D) 0.9032

Answer: D) 1 – value-from-normal-table(z= -1.3)

Problem 2.

Find the area of the indicated region under the standard normal curve?



A) 0.0212
B) 0.8489
C) 0.1504
D) 0.1292

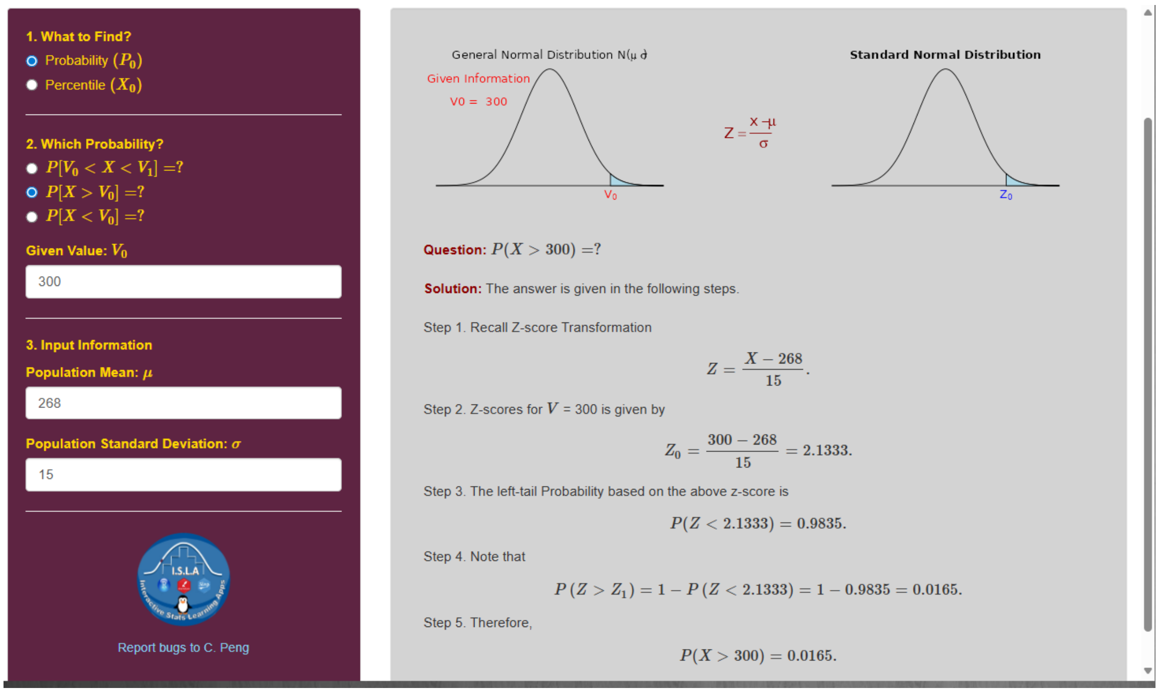
Answer: C). 0.1292381 + (1 – 0.9788217) = 0.1504

Problem 3

The lengths of pregnancies of humans are normally distributed with a mean of 268 days and a standard deviation of 15 days. Find the probability of a pregnancy lasting more than 300 days. [*Hint: draw related density curves and label the given information on the curves*]

A) 0.3189
B) 0.9834
C) 0.0166
D) 0.2375

Answer: C) Z = (300 – 268)/15 = 2.1333, right tail area: 1 – P(Z < 2.1333) = 0.0166

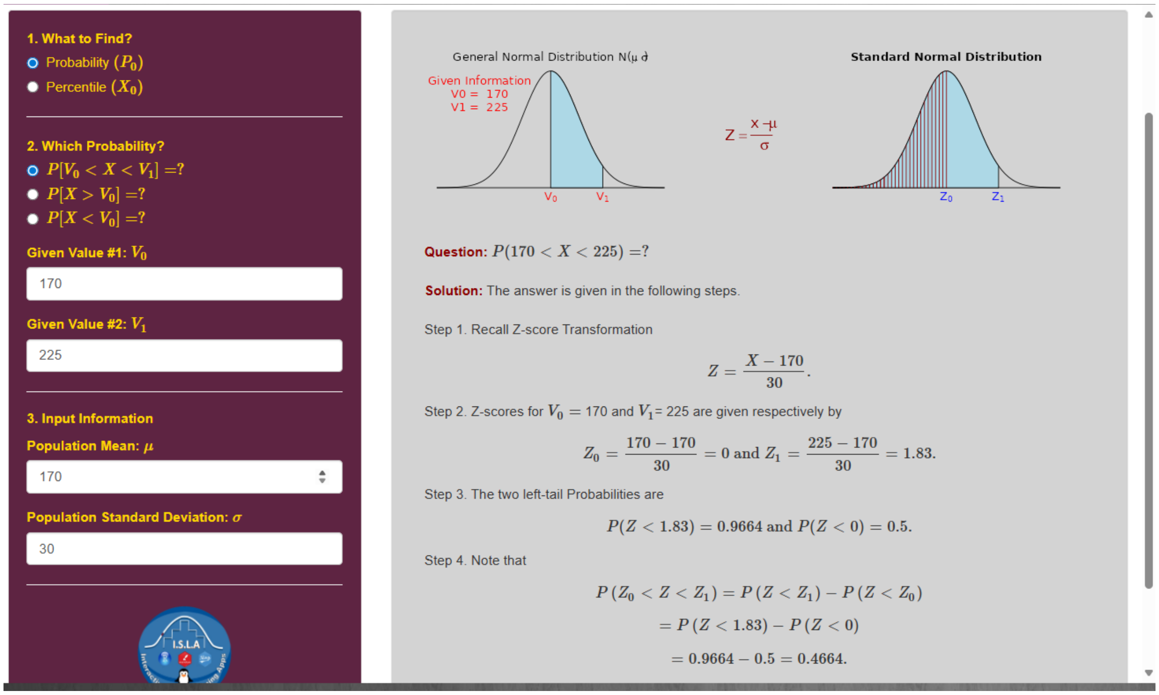


Problem 4

The distribution of cholesterol levels in teenage boys is approximately normal with μ =170 and σ=30 (Source: U.S. National Center for Health Statistics). Levels above 200 warrant attention. What percent of teenage boys have between 170 and 225? [*Hint: draw related density curves and label the given information on the curves*]

A). 46.66%
B). 3.36%
C). 6.06%
D). 56.13%

Answer: A) Z1 = (225-170)/30 = 1.833, z2 = (170-170)/30 = 0
P(Z<1.8333) – P(Z<0) = 0.966621 – 0.5 = 0.4664

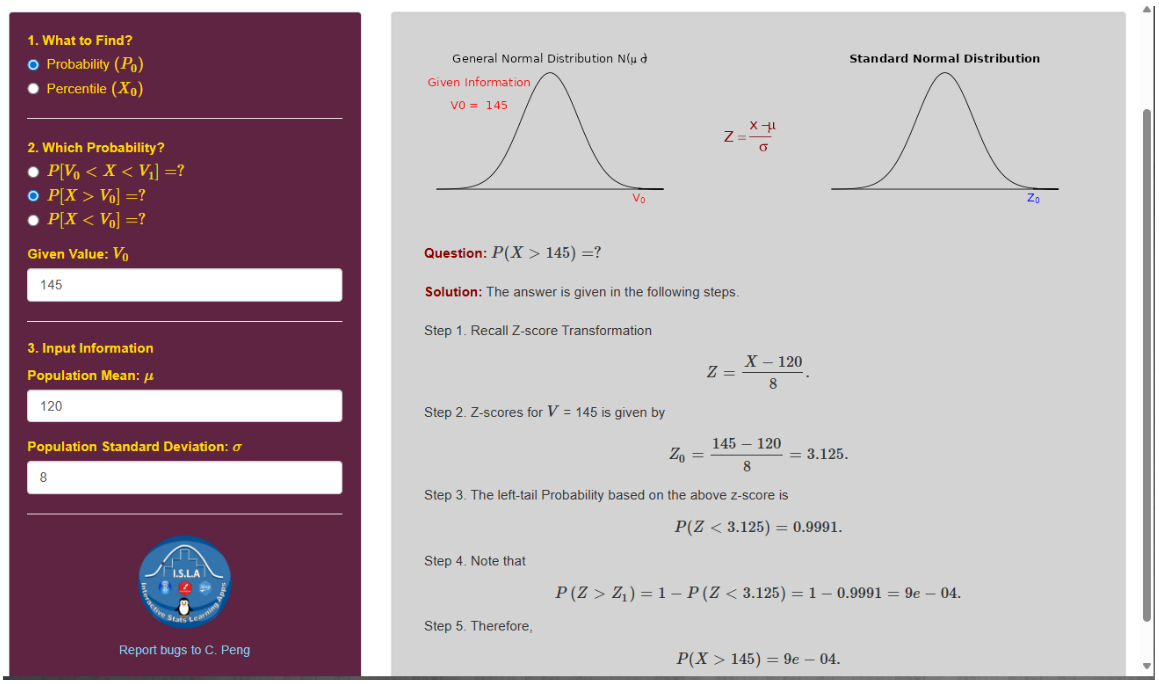


Problem 5

Assume that blood pressure readings are normally distributed with μ=120 and σ = 8. A blood pressure reading of 145 or more may require medical attention. What percent of people have blood pressure reading greater than 145?

A). 6.06%
B). 0.09%
C). 99.91%
D). 11.09%

Answer: B) Z = (145-120)/8 = 3.125. 1 - P(Z < 3.125) = 1 – 0.999111 = 0.000889

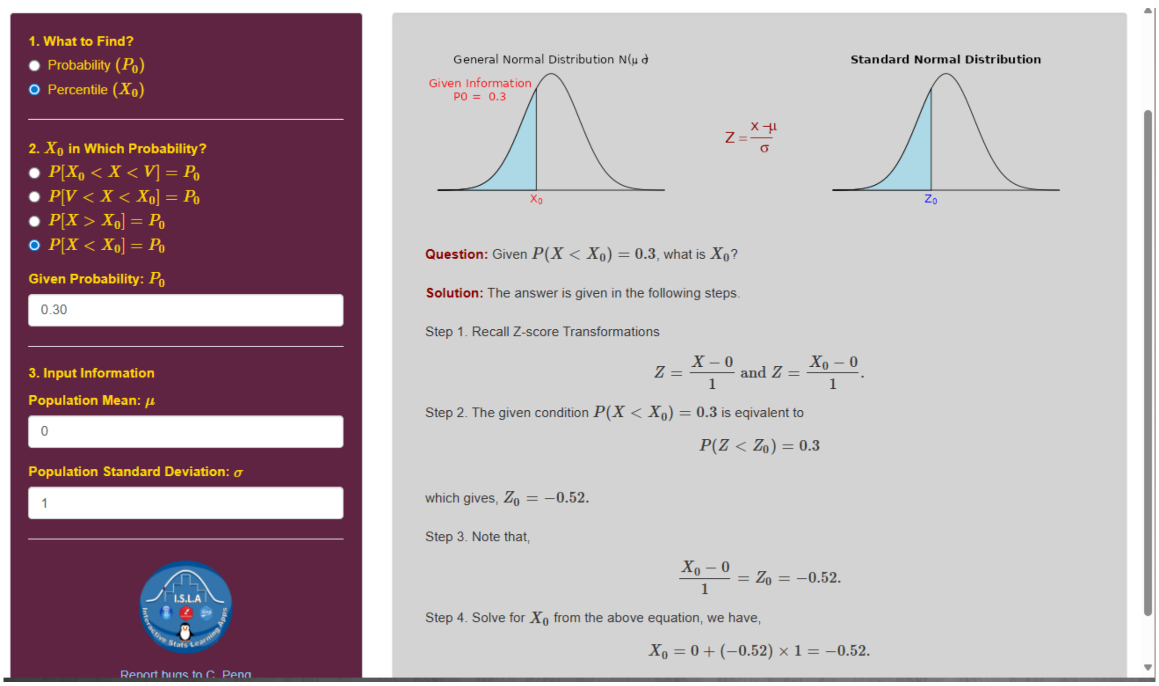


Problem 6

Find the 30th percentile of the standard normal distribution. (*Hint: choose the closest to your answer*)

A). -0.52
B). -0.98
C). -0.47
D). -0.81

Answer: A) P(Z < Z0) = 0.70 ➔ Z0 = 0.5244 (from normal table)

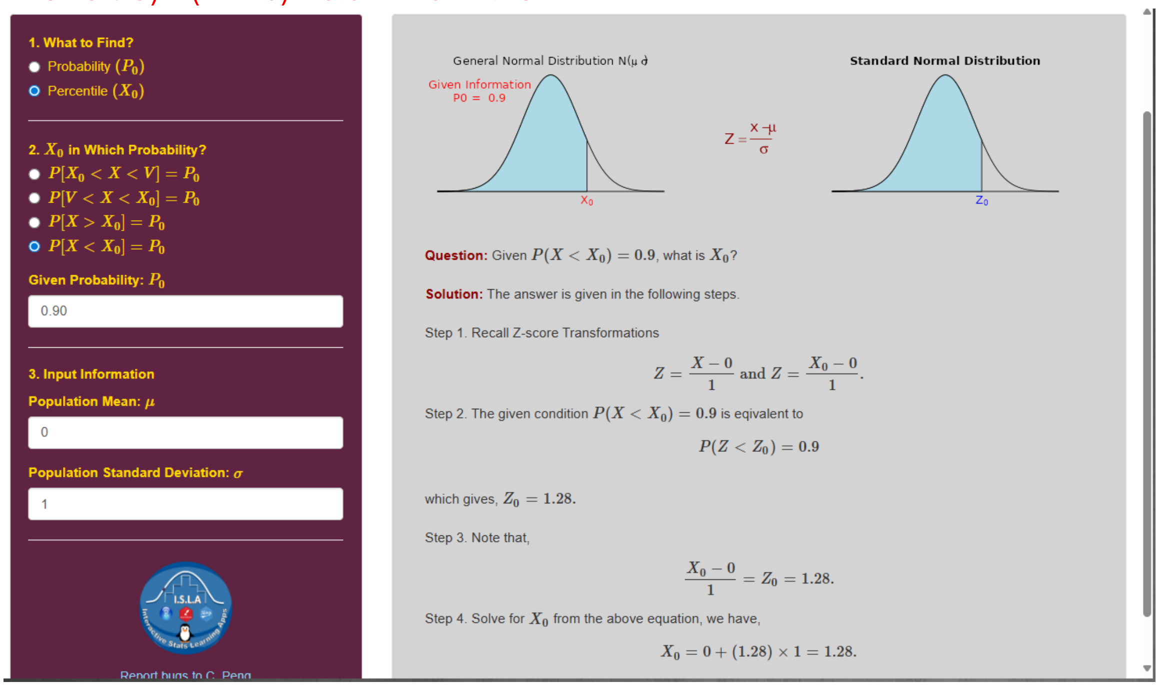


Problem 7

For the standard normal curve, find the z-score that corresponds to the 90th percentile.

A). 0.28
B). 2.81
C). 1.28
D). 1.52

Answer: C) P(Z < Z0) = 0.9 ➔ Z0 = 1.28



Problem 8

IQ test scores are normally distributed with a mean of 100 and a standard deviation of 15. Find the x-score that corresponds to a z-score of 2.33.

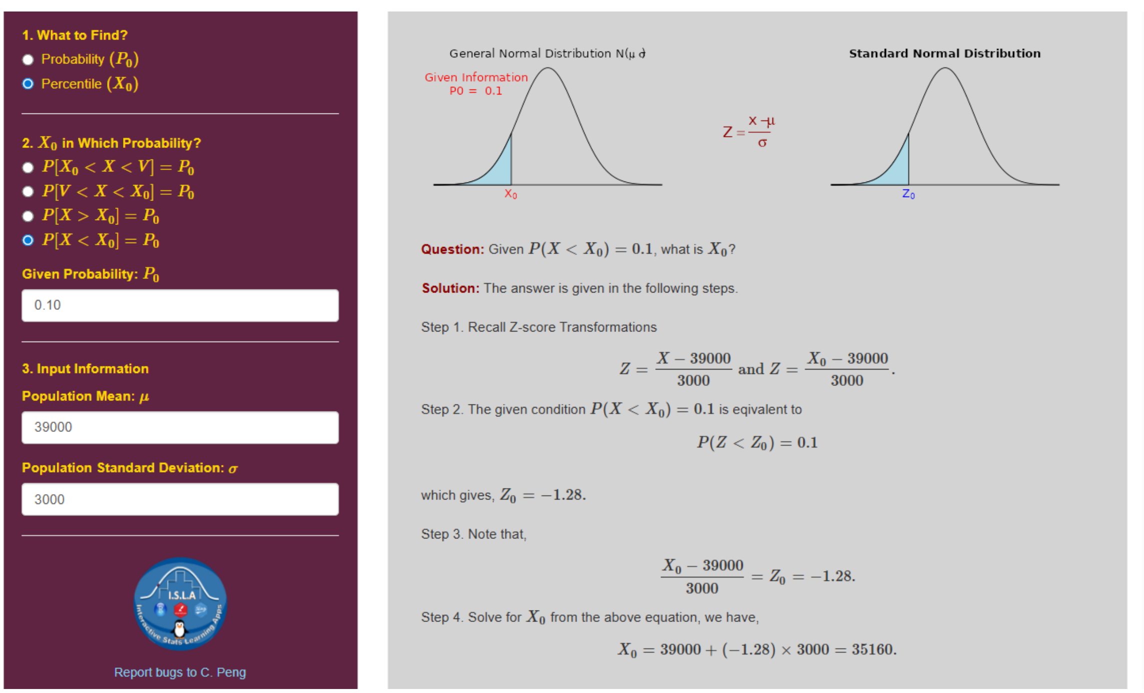
A). 142.35
B). 134.95
C). 139.55
D). 125.95

Answer: **B)** (X – 100)/15 = 2.33 ➔ X = 134.95

Problem 9

Assume that the salaries of elementary school teachers in the United States are normally distributed with a mean of $39,000 and a standard deviation of $3000. What is the cutoff salary for teachers in the bottom 10%?
A). $35,160
B). $43,935
C). $34,065
D) .$42,400

Answer: A) P(Z < Z0) = 0.1. ➔ Z0 = -1.28. Plug in the percentile -1.28 to the z-score transformation, (X-3900)/3000 = -1.28 ➔ X = 3900 – 1.28*3000 = 35160

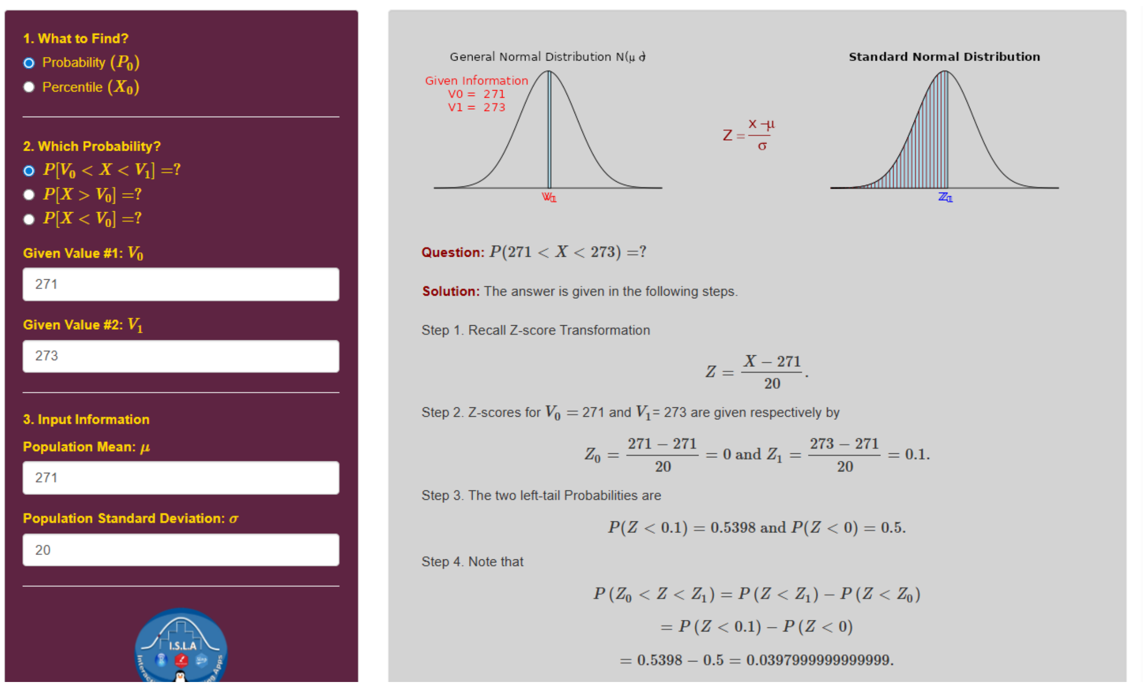


Problem 10

The lengths of pregnancies are normally distributed with a mean of 271 days and a standard deviation of 20 days. If a woman is randomly selected, find the probability that she has a pregnancy between 271 days and 273 days.

A). 0.02119
B). 0.57936
C). 0.52881
D). 0.03980

Answer: D)
Z1 = (271-271)/20 = 0, Z2 = (273-271)/20 = 0.1,
P(Z1 < Z < Z2) = P(Z < Z2) – P(Z < Z1) = 0.5398 – 0.5 = 0.0398



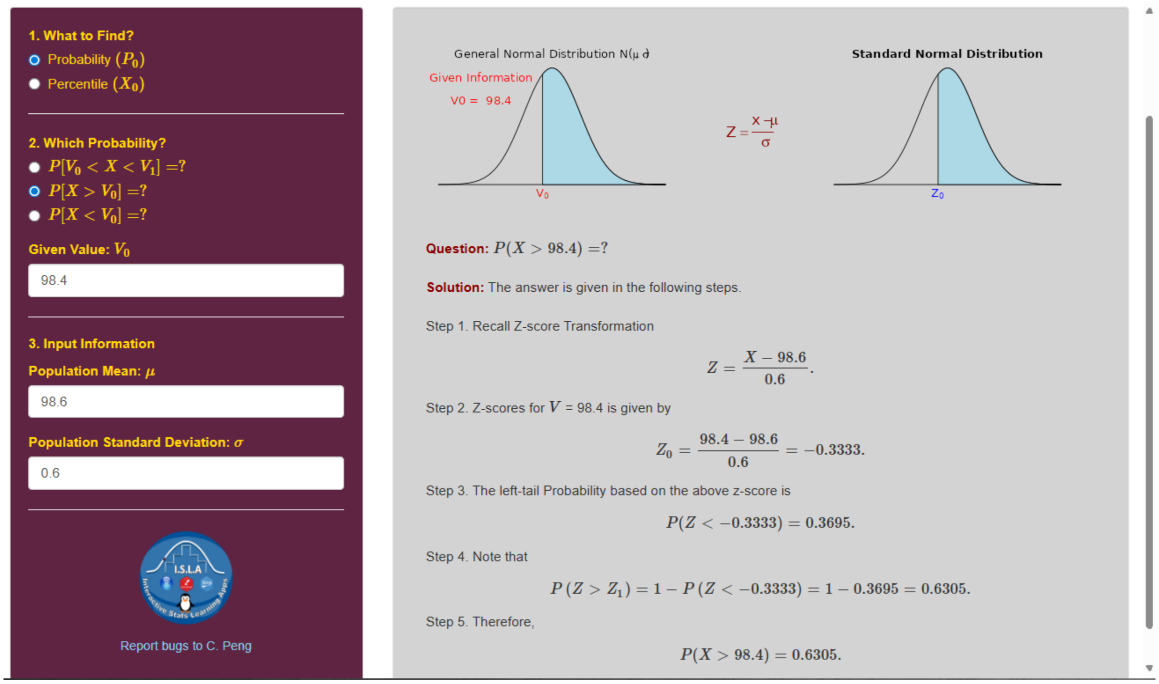
Problem 11

The body temperatures of adults are normally distributed with a mean of 98.6° F and a standard deviation of 0.60° F. If one adult is randomly selected, find the probability that his body temperature is greater than 98.4° F.

A). 0.63056

B). 0.0228
C). 0.1368
D). 0.3694

Answer: A) Z= (98.4 – 98.6)/0.6 = -0.333, 1 – P(Z<-0.333) = 1 – 0.3694 = 0.63056

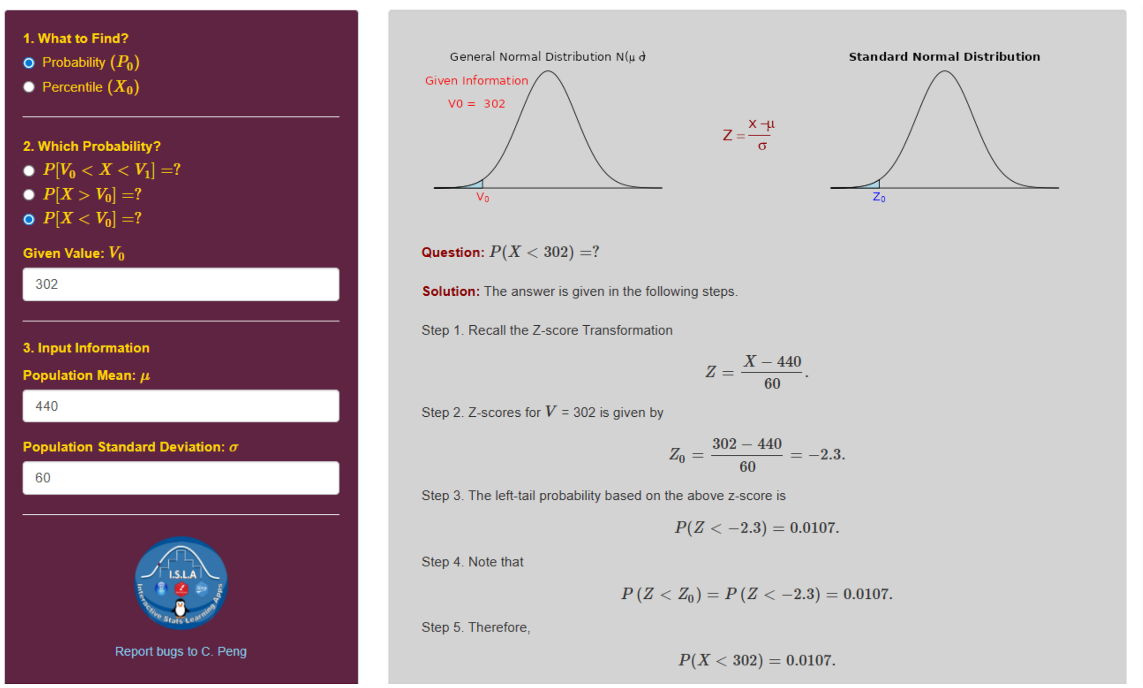


Problem 12

A physical fitness association is including the mile run in its secondary-school fitness test. The time for this event for boys in secondary school is known to possess a normal distribution with a mean of 440 seconds and a standard deviation of 60 seconds. Find the probability that a randomly selected boy in secondary school can run the mile in less than 302 seconds.

A) .9893
B) .0107
C) .5107
D) .4893

Answer B. $Z_0 = (302-440)/60 = -2.3$, $P(Z < -2.3) = 0.0107$

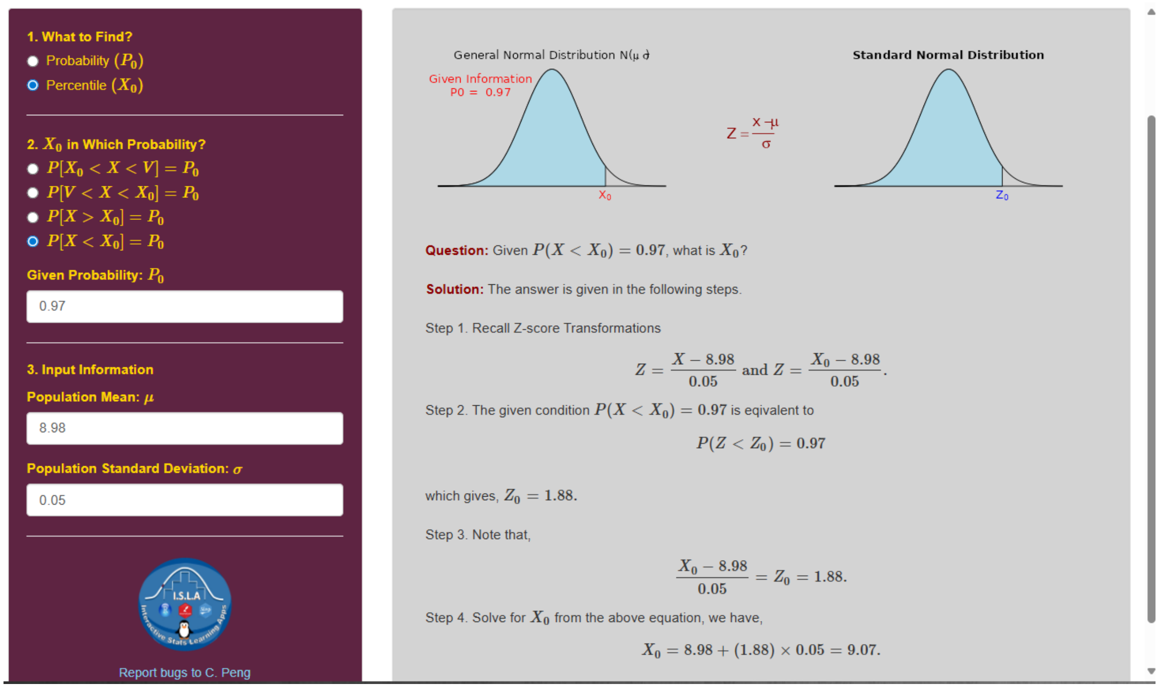


Problem 13

The weights of certain machine components are normally distributed with a mean of 8.98 g and a standard deviation of 0.05 g. Find the 97th percentile.

A). 9.00 g
B). 9.07 g
C). 9.12 g
D). 8.99 g

Answer B. $P(Z < Z0) = 0.97$ ➔ $Z0 = 1.88$. Therefore, by z-score transformation, $(x - 8.98)/0.05 = 1.88$ ➔ $X = 8.98 + 1.88*0.05 = 9.074$

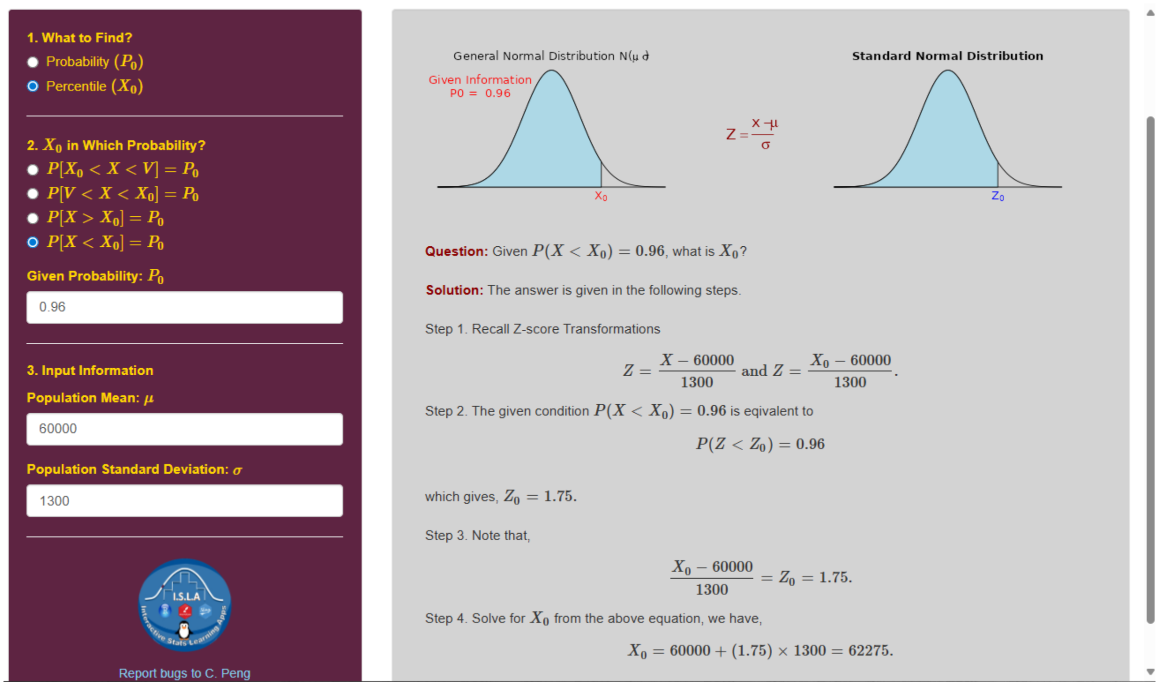


Problem 14

The tread life of a particular brand of tire is a random variable best described by a normal distribution with a mean of 60,000 miles and a standard deviation of 1300 miles. What warranty should the company use if they want 96% of the tires to outlast the warranty?

A). 61,300 miles
B). 62,275 miles
C). 57,725 miles
D). 58,700 miles

Answer B. P(Z < Z0) = 0.96 ➔ Z0 = 1.75, therefore, (X – 60000)/1300 = 1.75 ➔ Z = 62275.



Problem 15

Assume that the heights of women are normally distributed with a mean of 63.6 inches and a standard deviation of 2.5 inches. If a woman is randomly selected, find the probability that her height is 63.0 inches.

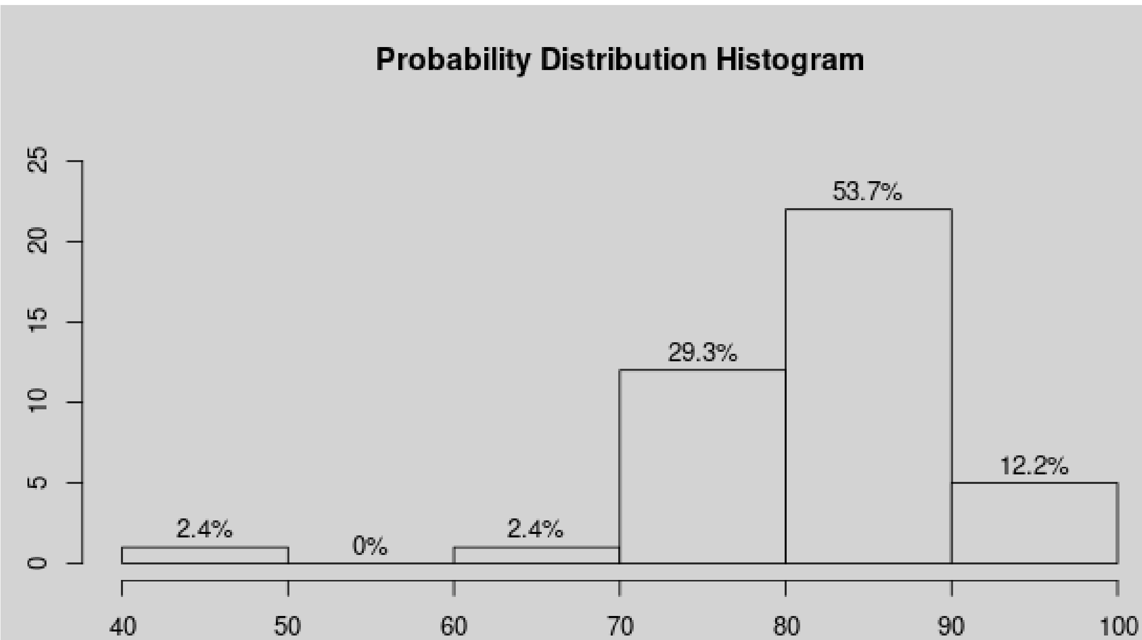
A). 0.28810
B). 0 .0000
C). 0.9918
D). 0.8989

Answer B. The probability of continuous distribution at any specific value is always 0.

Week #4 Assignment Summary

The class boundary is: 40,50,60,70,80,90,100

cut.data.freq	Freq	midpts	rel.freq	cum.freq	rel.cum.freq
[4e+01,5e+01]	1	45.00	0.02	1	0.02
(5e+01,6e+01]	0	55.00	0.00	1	0.02
(6e+01,7e+01]	1	65.00	0.02	2	0.05
(7e+01,8e+01]	12	75.00	0.29	14	0.34
(8e+01,9e+01]	22	85.00	0.54	36	0.88
(9e+01,1e+02]	5	95.00	0.12	41	1.00



The five-number summary of this given data set is:

stats	value
Min.	40.00
1st Qu.	80.00
Median	85.00
3rd Qu.	90.00
Max.	100.00