



Problem 1 – Finding the Percentile Given the Score

For a certain test, the scores are normally distributed with a mean of 25.7 and a standard deviation of 11.5.

A student who scored in the x^{th} percentile has a score that is higher than $x\%$ of the scores. Without calculating, in what percentile is a score...

1. In what percentile is a score, if it is...
 - the mean?
 - one standard deviation above the mean?
 - one standard deviation below the mean?

Graph the normal distribution of the scores described above by pressing $\boxed{Y=}$ and entering **normalpdf(X, 25.7, 11.5)**. The **normalpdf** command is in the DISTR menu, accessed by pressing $\boxed{2\text{nd}} \boxed{[DISTR]}$.

Press \boxed{WINDOW} and set the values as shown at right.

```

WINDOW
Xmin=-5
Xmax=60
Xscl=1
Ymin=0
Ymax=.05
Yscl=0
Xres=1

```

Use the graph and what you know about the 68–95–99.7 rule to estimate the percentile for each of the following scores.

2.

	33	50	26	12
Guesses				
Actual				

Check your estimates using the **normalcdf** command, found in the DISTR menu. In the parentheses, enter the lower bound, the upper bound, the mean, and the standard deviation.

Note: The lower bound is negative infinity; use -1×10^{99} , entered as $-1E99$. To type E, press $\boxed{2\text{nd}} \boxed{[EE]}$.

```

DISTR DRAW
1:normalpdf(
2:normalcdf(
3:invNorm(
4:invT(
5:tpdf(
6:tcdf(
7:χ²pdf(

```

3. In what percentile is a student who scored a 610 on a test with $\bar{x} = 500$ and $\sigma = 28$?

4. In what percentile is a student who scored a 17 on a test with $\bar{x} = 20$ and $\sigma = 2.5$?

Problem 2 – Finding the Score Given the Percentile

The scores on a test are normally distributed with a mean of 120 and a standard deviation of 12, or $N(120, 12)$.

5. Estimate the lowest score a student needs to have to be in the following percentiles.

	60th	30th	70th	90th
Guesses				
Actual				

Check your estimates using the **invNorm** command in the DISTR menu. In the parentheses enter, the percentile, the mean, and the standard deviation. (Enter the percentile as a decimal.)

```
invNorm(0.6, 120,
12)
```

Problem 3 – Practice

6. Helen scored 465 on a test with $N(380, 42)$. Juan scored 88 on a test with $N(65, 10)$. Who is in the higher percentile?

7. Ty scored lower than 14% of the rest of the students on a test with $N(200, 35)$. Estimate Ty's score.

8. What score must Shuang get to be in the top 5% of students taking a test with $N(325, 35)$?