

The Standard Normal Probability Distribution

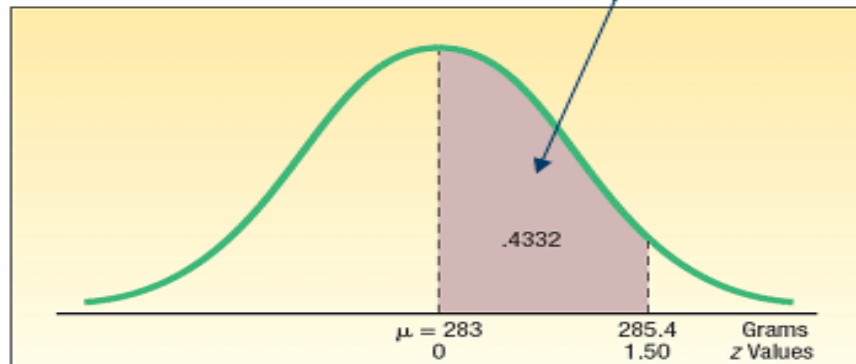
The Standard Normal Probability Distribution

- The standard normal distribution is a normal distribution with a mean of 0 and a standard deviation of 1.
- It is also called the z distribution.
- A z -value is the signed distance between a selected value, designated X , and the population mean μ , divided by the population standard deviation, σ .
- The formula is:

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

Areas Under the Normal Curve

<i>z</i>	0.00	0.01	0.02	0.03	0.04	0.05	...
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	
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The Normal Distribution – Example

The weekly incomes of shift foremen in the glass industry follow the normal probability distribution with a mean of \$1,000 and a standard deviation of \$100.

What is the z value for the income, let's call it X , of a foreman who earns \$1,100 per week? For a foreman who earns \$900 per week?

For $X = \$1,100$:

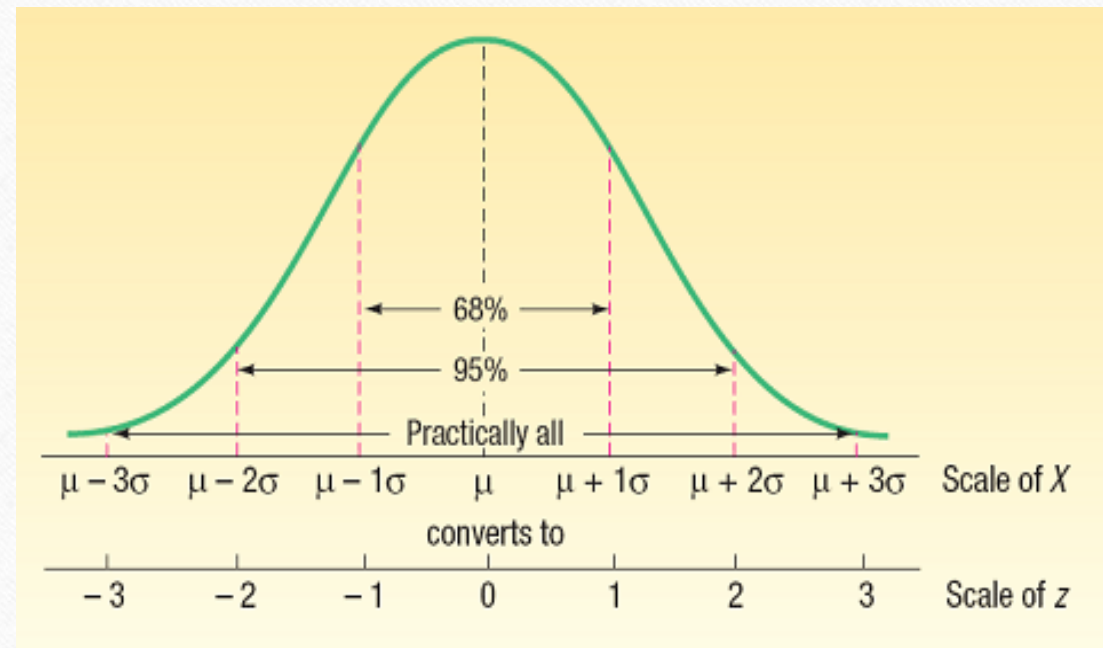
$$z = \frac{X - \mu}{\sigma} = \frac{\$1,100 - \$1,000}{\$100} = 1.00$$

For $X = \$900$:

$$z = \frac{X - \mu}{\sigma} = \frac{\$900 - \$1,000}{\$100} = -1.00$$

The Empirical Rule

- About 68 percent of the area under the normal curve is within one standard deviation of the mean.
- About 95 percent is within two standard deviations of the mean.
- Practically all is within three standard deviations of the mean.



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THANK YOU