## Algebra 2

## 9-01 Using Normal Distributions

## Normal Distribution

- A normal distribution is modeled by a $\qquad$ -shaped curve called a $\qquad$ curve that is symmetric about the $\qquad$ .



## Normal Distribution Properties

- A normal distribution with mean $\mu$ and standard deviation $\sigma$ has the following properties:

1. The total area under the related normal curve is $\qquad$ .
2. About $\qquad$ of the area lies within $\qquad$ standard deviation of the mean.
3. About $\qquad$ of the area lies within $\qquad$ standard deviations of the mean.
4. About $\qquad$ of the area lies within $\qquad$ standard deviations of the mean.


A normal distribution has mean and standard deviation. For a randomly selected $x$-value from the distribution, find $\mathrm{P}(\mu-\sigma \leq$ $x \leq \mu+3 \sigma$ )
$P(x \leq \mu-\sigma)$

The weight of strawberry packages is normally distributed with a mean of 16.18 oz and standard deviation of 0.34 oz . If you randomly choose a container, what is the probability that it weighs less than 15.5 oz ?
$\mu=33, \sigma=4$, find $P(29 \leq x \leq 37)$

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## Standard Normal Distribution

- Normal distribution with mean $=$ $\qquad$ and standard deviation $=$ $\qquad$ .
- Formula $=z=\frac{x-\mu}{\sigma}$
- The $z$ value for a particular $x$-value is called the $\qquad$ for the $x$-value and is the number of $\qquad$ the $x$-value lies above or below the $\qquad$ $\bar{x}$.
A survey of 20 colleges found that the average credit card debt for seniors was $\$ 3450$. The debt was normally distributed with a standard deviation of $\$ 1175$. Find the $z$-score corresponding to an $x$-value of $\$ 3600$.
$\sigma=34, z$-score $=-1.5, x=138$ what is $\mu$ ?


## Skewed

- Normal distribution: mean $\qquad$ median
- Skewed distribution: mean $\qquad$ median
- If mean < median, skewed $\qquad$
- If mean > median, skewed $\qquad$

Bell-shaped and

Skewed left


Skewed right

Determine whether each histogram has a normal distribution.



470 \#1, 3, 5, 7, $9,11,13,15,17,18,19,23,24,33,37,39,41,43,45,47=20$

