

Formula Sheet

Properties of Absolute-Value Inequities

Let x and y be real numbers.

(1) If $x \neq 0$, then $|x| > 0$.

(2) $|x| = 0$ if and only $x = 0$

(3) $|-x| = |x|$, $|x| \geq |x|$, $|x| \leq |x|$

(4) $-|x| \leq x \leq |x|$

(5) $|x + y| \leq |x| + |y|$

(6) $|x - y| \leq |x| + |y|$

(7) $||x| - |y|| \leq |x - y|$

(8) $|xy| = |x||y|$

(9) $\left| \frac{x}{y} \right| \leq \frac{|x|}{|y|}$

(10) $|x|^2 = x^2$

Definition: Let $F : X \rightarrow Y$ be a function from a set X to a set Y .

- F is **one-to-one (injective)**: $\forall x_1, x_2 \in X$, if $F(x_1) = F(x_2)$, then $x_1 = x_2$.
- F is **onto (surjective)**: $\forall y \in Y, \exists x \in X$ such that $F(x) = y$.