WORKSHEET 3

MATH 101

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Theorem 1 (Squeeze Theorem)**.** *Let $f(x)$, $g(x)$, and $h(x)$ be functions defined for all $x \neq a$ over an open interval containing a. Suppose:*

$f(x) \leqslant g(x) \leqslant h(x)$ *for all $x \neq a$ in an open interval containing a*

and

$$\lim_{x \to a} f(x) = L = \lim_{x \to a} h(x)$$

where L is a real number. Then,

$$\lim_{x \to a} g(x) = L.$$

Definition 1. Let $f(x)$ be a function. If any of the following conditions hold, then the line $x = a$ is a **vertical** asymptote of $f(x)$.

$$\lim_{x \to a^-} f(x) = +\infty \text{ or } -\infty$$
$$\lim_{x \to a^+} f(x) = +\infty \text{ or } -\infty$$
$$\text{or}$$
$$\lim_{x \to a} f(x) = +\infty \text{ or } -\infty$$

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