Calculus AB

1-3

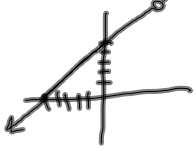
(Day 1 - Handout)

Evaluating Limits Analytically

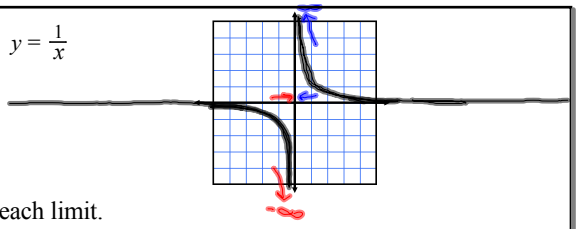
Find each limit.

1) $\lim_{x \to 3} x^3 = 27$

7) $\lim_{x \to 5} \frac{x^2 - 25}{x - 5} = \lim_{x \to 5} \frac{(x+5)(x-5)}{(x-5)} = 10$



Graph $y = \frac{1}{x}$



Find each limit.

$\lim_{x \to 0} \frac{1}{x} = \varnothing$

$\lim_{x \to \infty} \frac{1}{x} = 0$

$\lim_{x \to -\infty} \frac{1}{x} = 0$

Asymptote Rules given $f(x) = \frac{p(x)}{q(x)}$ Use for limits at infinity

vertical asymptotes: $q(x) = 0$; $q(x)$ is not a factor of $p(x)$

hole: $q(x) = 0$; $q(x)$ is a factor of $p(x)$

horizontal asymptotes:

a: degree of $p(x)$ < degree of $q(x)$ then $y = 0$

b: degree of $p(x)$ > degree of $q(x)$ then there is none.

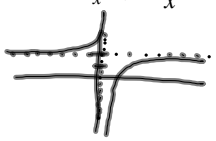
c: degree of $p(x)$ = degree of $q(x)$ then $y =$ (ratio of coefficients)

$f(x) = \frac{3x^2 - 7x + 2}{5x^2 - 1x - 11}$ $y = \frac{3}{5}$

Find each limit.

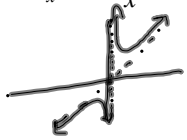
17) $\lim_{x \to \infty} \frac{2x - 5}{x} = 2$

Degree of the numerator is the same as the denominator, use *a*/*b*, or 2/1 = 2.



7) $\lim_{x \to \infty} \frac{3x^2 + 4}{x} =$ no limit ∞

Degree of the numerator is greater than the denominator, so there is no limit, or you can answer limit = ∞ since the function increases without bound.



Assignment:

Worksheet 1-3

1-35 all