**Section 1.5** (Infinite Limits)

Examine the function **f(x) =**  … What does the graph look like? What is the domain? What happens as x approaches 1? From the left? From the right

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| **x** | **f(x) =**  |
| **0** |  |
| **0.5** |  |
| **0.9** |  |
| **0.99** |  |
| **1.001** |  |

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A limit in which f(x) increases or decreases without bound as x approaches c is called an infinite limit (DNE)

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Example: Determine the limit of the following graph as x approaches 1 from the left and right…

If f(x) approaches ± infinity as x approaches c, then x = c is a vertical asymptote of the function.

Given ***simplified*** rational function, if *c* is a zero of *q(x)*, then *x =* *c* is a vertical asymptote of *f(x)*

Examples: Determine the vertical asymptotes of the following…

 f(x) = g(x) = h(x) = tan(x) f(x) =

Example: Determine

Consider the following properties of infinite limits when examining problems of this type…

Let c and L be real numbers and let f and g be functions such that and

1. Sum or difference:
2. Product: ( if L>0 or negative infinity if L < 0)
3. Quotient: Sum or difference:  **= 0**

Examples: Evaluate the following limits…

Application Example: Clark Griswold is hanging Christmas lights again when the base of his 25-ft. ladder begins to slide out from the wall of the house at a rate of 2 feet per second. The top of the ladder is moving down the wall at a rate of r = feet per second, where x is the distance of the base of the ladder from the wall.



1. Find the rate r when x is 8 feet
2. Find the rate r when x is 16 feet
3. Find the limit of r as x approaches 25 feet