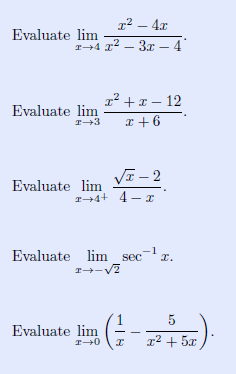
AP Calc WS#5 Limits involving Infinity Name: \_\_\_\_\_\_

Limits by algebraic simplification: The substitution rule cannot be used to evaluate if c is not in the domain of the function f (for instance, if it produces a zero in the denominator).



The symbol for infinity (∞) does not represent any real number. When we say “the limit of f as x approaches infinity” we mean the limit of function f as x moves increasingly far to the right on the number line.

Facts: When the *denominator* approaches zero then the *fraction* approaches infinity

When the *denominator* approaches infinity then the *fraction* approaches zero

We say

We say the line y = 0 is a **horizontal asymptote** of the graph f(x) = 1/x.

Check with your calculator.

Prove the horizontal asymptote of is the line y = 2

Use graphs and tables to find , identify all horizontal asymptotes of

Find the following limit and sketch its graph to support your answer

We say the line x = a is a **vertical asymptote** of the graph f(x) if either

or

Find the vertical asymptotes of the following, Describe the behavior to the left and right of each vertical asymptotes

a. b. f(x) = tan x

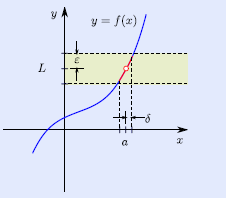
Find the following limits. Hint divide

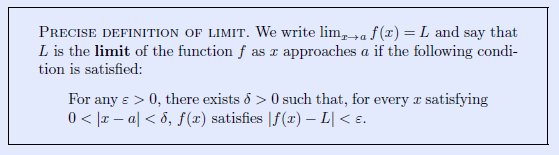
a. b.

c. d.

e. f.

Find the following limits. Hint: Using properties (cheatsheet)









Use squeeze theorem to show that

There are functions that you can't take limit algebraically, then using tabular method will help.

a. Use 6 decimals number

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0.9 | 0.99 | 0.999 | 1 | 1.001 | 1.01 | 1.1 |
|  |  |  |  |  |  |  |

b. Use 6 decimals number

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| -0.1 | -0.01 | -0.001 | 0 | 0.001 | 0.01 | 0.1 |
|  |  |  |  |  |  |  |

c. Radian mode. Use 6 decimals number

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| -0.1 | -0.01 | -0.001 | 0 | 0.001 | 0.01 | 0.1 |
|  |  |  |  |  |  |  |

d. Radian mode. Use 6 decimals number

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| -0.1 | -0.01 | -0.001 | 0 | 0.001 | 0.01 | 0.1 |
|  |  |  |  |  |  |  |