

February 4

Evaluate the following trig functions:

$$\sin(0) = 0$$

$$\cos(0) = 1$$

$$\sin(\pi/6) = \frac{1}{2}$$

$$\cos(\pi/6) = \frac{\sqrt{3}}{2}$$

$$\sin(\pi/4) = \frac{\sqrt{2}}{2}$$

$$\cos(\pi/4) = \frac{\sqrt{2}}{2}$$

$$\sin(\pi/3) = \frac{\sqrt{3}}{2}$$

$$\cos(\pi/3) = \frac{1}{2}$$

$$\sin(\pi/2) = 1$$

$$\cos(\pi/2) = 0$$

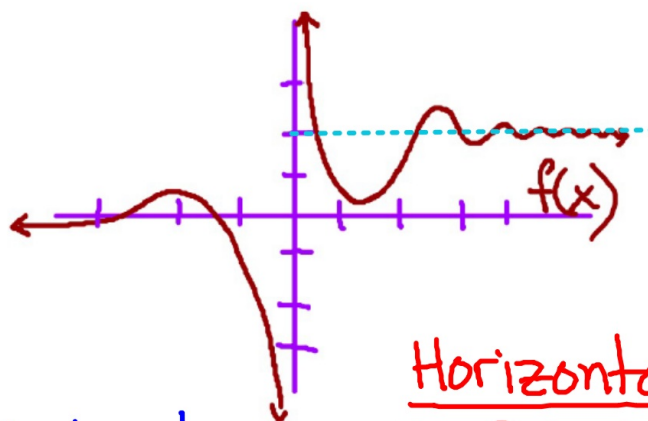
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Students will verbally explain how to  
use limits to find asymptotes

(using the words:  
indeterminate, factor, simplify, evaluate...)

Vertical Asymptotes	<p>the line <math>x=a</math> is a vertical asymptote if</p> $\lim_{x \rightarrow a^+} f(x) = \pm\infty \quad \lim_{x \rightarrow a^-} f(x) = \pm\infty$ <p>not zero / zero (when you divide by zero)</p> <p><math>y \rightarrow \pm\infty</math> graph can't cross a vertical asymptote</p>
Horizontal Asymptotes	<p>the line <math>y=c</math> is a horizontal asymptote if</p> $\lim_{x \rightarrow \infty} f(x) = c \quad \lim_{x \rightarrow -\infty} f(x) = c$ <p>"sweep away the crumbs"</p> <p><math>x \rightarrow \pm\infty</math> graph can cross a horizontal asymptote</p>
Continuity	<p>① <math>\lim_{x \rightarrow a} f(x)</math> exists  <math display="block">\lim_{x \rightarrow a^-} f(x) = \lim_{x \rightarrow a^+} f(x)</math></p> <p>② <math>f(a)</math> exists  the value of the function (the point) exists</p> <p>③ <math>f(a) = \lim_{x \rightarrow a} f(x)</math>  the value of the function is equal to the limit</p>

find all asymptotes



Vertical

$$x=0$$

$$\lim_{x \rightarrow 0^-} f(x) = -\infty$$

$$\lim_{x \rightarrow 0^+} f(x) = +\infty$$

Horizontal

$$y=2$$

$$\lim_{x \rightarrow \infty} f(x) = 2$$

$$y=0$$

$$\lim_{x \rightarrow -\infty} f(x) = 0$$

## Practice Problem Set 4:

Pg 89 #67-80

pg 94 #5-25 (odd), 45-54

Practice Problem Set 4:

Pg 89 #67-80

pg 94 #1-15, 45-54

In Exercises 1–4, show that the limit leads to an indeterminate form. Then carry out the two-step procedure: Transform the function algebraically and evaluate using continuity.

1.  $\lim_{x \rightarrow 6} \frac{x^2 - 36}{x - 6}$

Show Answer

factor + simplify

2.  $\lim_{h \rightarrow 3} \frac{9 - h^2}{h - 3}$

3.  $\lim_{x \rightarrow -1} \frac{x^2 + 2x + 1}{x + 1}$

Show Answer

4.  $\lim_{t \rightarrow 9} \frac{2t - 18}{5t - 45}$

In Exercises 5–34, evaluate the limit, if it exists. If not, determine whether the one-sided limits exist (finite or infinite).

5.  $\lim_{x \rightarrow 7} \frac{x - 7}{x^2 - 49}$

Show Answer

6.  $\lim_{x \rightarrow 8} \frac{x^2 - 64}{x - 9}$