**1.**(1 pt) Evaluate the limit

$$\lim_{x\to\infty} \frac{2+5x}{4-4x}$$

**2.**(1 pt) Evaluate the limit

$$\lim_{x\to\infty} \frac{2x+3}{4x^2-7x+11}$$

**3.**(1 pt) Evaluate the limit

$$\lim_{x\to\infty} \frac{2x^3-6x^2-4x}{11-7x-7x^3}$$

**4.**(1 pt) Find the horizontal limit(s) of the following function:

$$f(x) = \frac{8x^3-7x^2-11x}{8-8x-3x^3}$$

________ and ________

**5.**(1 pt) Evaluate the limit

$$\lim_{x\to\infty} \frac{(8-x)(5+5x)}{(3-5x)(9+10x)}$$

**6.**(1 pt) Evaluate the limit

$$\lim_{x\to\infty} \frac{\sqrt{4+4x^2}}{(5+7x)}$$

**7.**(1 pt) Evaluate

$$\lim_{x\to\infty} \frac{\sqrt{x^4-6x^3-10}}{1x^2-3}$$

**8.**(1 pt) Evaluate

$$\lim_{t\to\infty} \frac{3t-9}{\sqrt{t^2-6t+5}}$$

**9.**(1 pt) The horizontal asymptotes of the curve

$$y = \frac{20x}{(x^4+1)^{\frac{1}{4}}}$$

are given by
$y_1 =$ ________ and
$y_2 =$ ________
where $y_1 > y_2$.

The vertical asymptote of the curve

$$y = \frac{3x^3}{x+6}$$

is given by $x =$ ________

**10.**(1 pt) Evaluate

$$\lim_{x\to\infty} \sqrt{x^2+1x+1} - x$$

**11.**(1 pt) Determine the infinite limit of the following functions. Enter INF for $\infty$ and MINF for $-\infty$.

__ 1. $\lim_{x\to 3^-} \frac{2}{x-3}$

__ 2. $\lim_{x\to -7^-} \frac{1}{x^2(x+7)}$

__ 3. $\lim_{x\to 5} \frac{2}{(x-5)^6}$

__ 4. $\lim_{x\to 5^-} \frac{2}{(x-5)^3}$

**12.**(1 pt)

Evaluate the following limits. If needed, enter INF for $\infty$ and MINF for $-\infty$.

(a)

$$\lim_{x\to \frac{5}{6}^+} \frac{-34x}{5-6x} =$$

(b)

$$\lim_{x\to \frac{5}{6}^-} \frac{-34x}{5-6x} =$$

**13.**(1 pt)

Evaluate the following limits.

(a)

$$\lim_{x\to\infty} \frac{5}{e^x+4} =$$

(b)

$$\lim_{x\to-\infty} \frac{5}{e^x+4} =$$

[NOTE: If needed, enter INF for $\infty$ and MINF for $-\infty$.]
[HINT: Look at where the exponential fuction is going in the fraction. If you need a reminder, look up infinite limits in Section 2.5 (in particular, see pg 138-139).]

**14.**(1 pt)

Evaluate the following limits. If needed, enter INF for $\infty$ and MINF for $-\infty$.

(a)

$$\lim_{x\to\infty} \frac{3+10x}{3-2x} =$$

(b)

$$\lim_{x\to-\infty} \frac{3+10x}{3-2x} =$$

**15.**(1 pt)

Evaluate the following limits. If needed, enter INF for $\infty$ and MINF for $-\infty$.

(a)
$$\lim_{x\to\infty}\frac{11x+9}{8x^2-9x+10}$$

(b)
$$\lim_{x\to-\infty}\frac{11x+9}{8x^2-9x+10}$$

**16.**(1 pt)
Evaluate the following limits. If needed, enter INF for $\infty$ and MINF for $-\infty$.
(a)
$$\lim_{x\to\infty}\frac{6x^3-6x^2-8x}{5-10x-2x^3}=$$

(b)
$$\lim_{x\to-\infty}\frac{6x^3-6x^2-8x}{5-10x-2x^3}=$$

**17.**(1 pt)
Evaluate the following limits. If needed, enter INF for $\infty$ and MINF for $-\infty$.
(a)
$$\lim_{x\to\infty}\frac{(8-x)(2+7x)}{(3-8x)(10+10x)}=$$

(b)
$$\lim_{x\to-\infty}\frac{(8-x)(2+7x)}{(3-8x)(10+10x)}=$$

**18.**(1 pt)
Evaluate the following limits. If needed, enter INF for $\infty$ and MINF for $-\infty$.
(a)
$$\lim_{x\to\infty}\frac{\sqrt{8+3x^2}}{3+2x}=$$

(b)
$$\lim_{x\to-\infty}\frac{\sqrt{8+3x^2}}{3+2x}=$$

**19.**(1 pt)
Evaluate the following limits. If needed, enter INF for $\infty$ and MINF for $-\infty$.
(a)
$$\lim_{x\to\infty}\frac{\sqrt{x^4+7x^3+10}}{7x^2-7}=$$

(b)
$$\lim_{x\to-\infty}\frac{\sqrt{x^4+7x^3+10}}{7x^2-7}=$$

**20.**(1 pt)
Evaluate the following limits. If needed, enter INF for $\infty$ and MINF for $-\infty$.
(a)
$$\lim_{x\to\infty}\left(\sqrt{x^2+2x+1}-x\right)=$$

(b)
$$\lim_{x\to-\infty}\left(\sqrt{x^2+2x+1}-x\right)=$$

**21.**(1 pt)
Evaluate the following limits. If needed, enter INF for $\infty$ and MINF for $-\infty$.
(a)
$$\lim_{x\to\infty}\left(-12x^2+27x^3\right)=$$

(b)
$$\lim_{x\to-\infty}\left(-12x^2+27x^3\right)=$$

**22.**(1 pt)
A function is said to have a **vertical asymptote** wherever the limit on the left or right (or both) is either positive or negative infinity.
For example, the function $f(x)=\frac{x^2-4}{(x-3)^2}$ has a vertical asymptote at $x=3$.

For each of the following limits, enter either 'P' for positive infinity, 'N' for negative infinity, or 'D' when the limit simply does not exist.
$\lim_{x\to3^-}\frac{x^2-4}{(x-3)^2}=$ ______
$\lim_{x\to3^+}\frac{x^2-4}{(x-3)^2}=$ ______
$\lim_{x\to3}\frac{x^2-4}{(x-3)^2}=$ ______

**23.**(1 pt)
A function is said to have a **vertical asymptote** wherever the limit on the left or right (or both) is either positive or negative infinity.
For example, the function $f(x)=\frac{-3(x+2)}{x^2+4x+4}$ has a vertical asymptote at $x=-2$.

For each of the following limits, enter either 'P' for positive infinity, 'N' for negative infinity, or 'D' when the limit simply does not exist.
$\lim_{x\to-2^-}\frac{-3(x+2)}{x^2+4x+4}=$ ______
$\lim_{x\to-2^+}\frac{-3(x+2)}{x^2+4x+4}=$ ______
$\lim_{x\to-2}\frac{-3(x+2)}{x^2+4x+4}=$ ______

**24.**(1 pt)
A function is said to have a **vertical asymptote** wherever the limit on the left or right (or both) is either positive or negative infinity.
For example, the function $f(x)=\frac{9-x^2}{(x-1)^5(x-6)}$ has a vertical asymptote at $x=1$.

For each of the following limits, enter either 'P' for positive infinity, 'N' for negative infinity, or 'D' when the limit simply does not exist.

$\lim_{x\to 1^-} \frac{9-x^2}{(x-1)^5(x-6)} =$ ______

$\lim_{x\to 1^+} \frac{9-x^2}{(x-1)^5(x-6)} =$ ______

$\lim_{x\to 1} \frac{9-x^2}{(x-1)^5(x-6)} =$ ______

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**25.**(1 pt)

A function is said to have a **horizontal asymptote** if either the limit at infinity exists or the limit at negative infinity exists.

Show that each of the following functions has a horizontal asymptote by calculating the given limit.

$\lim_{x\to\infty} \frac{-7x}{4+2x} =$ ______

$\lim_{x\to-\infty} \frac{5x-4}{x^3+5x-3} =$ ______

$\lim_{x\to\infty} \frac{x^2-9x-10}{2-6x^2} =$ ______

$\lim_{x\to\infty} \frac{\sqrt{x^2+8x}}{13-7x} =$ ______

$\lim_{x\to-\infty} \frac{\sqrt{x^2+8x}}{13-7x} =$ ______

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**26.**(1 pt)

A function is said to have a **horizontal asymptote** if either the limit at infinity exists or the limit at negative infinity exists.

Show that each of the following functions has a horizontal asymptote by calculating the given limit.

$\lim_{x\to\infty} 7+\frac{3x}{x^2-5x+4} =$ ______

$\lim_{x\to-\infty} \frac{7-13x}{7+x}+\frac{14x^2+14}{(9x-4)^2} =$ ______

$\lim_{x\to-\infty} \frac{5x+2}{x-6}\cdot\frac{3x-7}{-x-2} =$ ______

$\lim_{x\to\infty} \sqrt{x^2+13x-8}-x =$ ______

$\lim_{x\to-\infty} \sqrt{x^2+13x-8}+x =$ ______