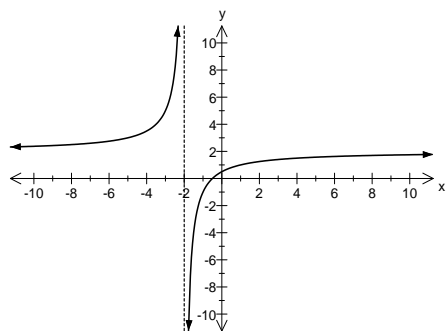


PM-Calculus

1.6 -Limits AT Infinity & Asymptotic Behaviour

If $\lim_{x \rightarrow a} f(x) = \pm\infty$ then the graph of $f(x)$ has _____.

What is the meaning of $\lim_{x \rightarrow \pm\infty} f(x)$??



$$\lim_{x \rightarrow -2} \frac{2x+1}{x+2} =$$

$$\lim_{x \rightarrow -\infty} \frac{2x+1}{x+2} =$$

$$\lim_{x \rightarrow +\infty} \frac{2x+1}{x+2} =$$

If $\lim_{x \rightarrow \pm\infty} f(x) = L$ then possible values of L are:

$L = +\infty$: f is _____ without bound at very large values of x .

$L = -\infty$: f is _____ without bound at very large values of x .

$L = \mathfrak{R}$: f is _____ at very large values of x .

If $\lim_{x \rightarrow \pm\infty} f(x) = L$ then the graph of $f(x)$ has _____.

How to find limits AT infinity, algebraically.

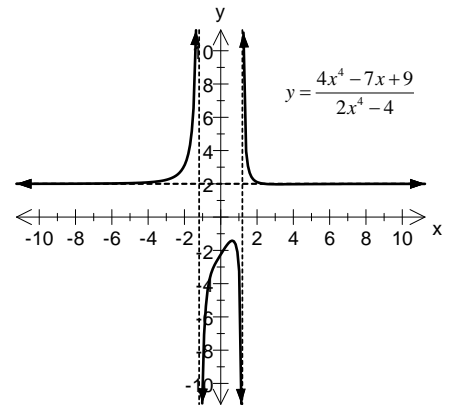
Step I Re-write $f(x)$ as an equivalent form by dividing numerator and denominator by highest power of x .

Step II Use the facts: $\lim_{x \rightarrow \pm\infty} \frac{\mathfrak{R}}{x} = 0$ and $\frac{\pm\mathfrak{R}}{0} = \pm\infty$ to determine the value of each term in the expression.

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

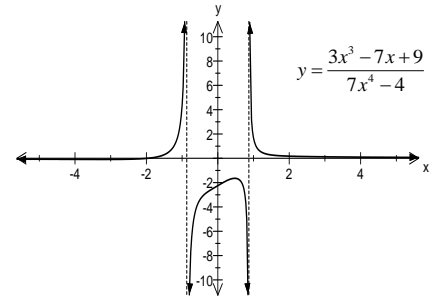
2. $\lim_{x \rightarrow -\infty} \frac{2x+1}{x+2} =$

3. a) $\lim_{x \rightarrow \infty} \frac{4x^4 - 7x + 9}{2x^4 - 4} =$



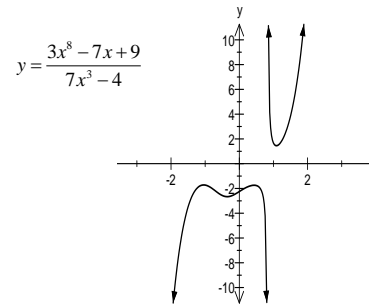
b) $\lim_{x \rightarrow -\infty} \frac{4x^4 - 7x + 9}{2x^4 - 4} =$

4. a) $\lim_{x \rightarrow \infty} \frac{3x^3 - 7x + 9}{7x^4 - 4} =$



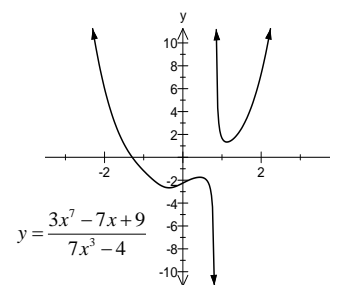
b) $\lim_{x \rightarrow -\infty} \frac{3x^3 - 7x + 9}{7x^4 - 4} =$

5. a) $\lim_{x \rightarrow \infty} \frac{3x^8 - 7x + 9}{7x^3 - 4} =$



b) $\lim_{x \rightarrow -\infty} \frac{3x^8 - 7x + 9}{7x^3 - 4} =$

6. a) $\lim_{x \rightarrow \infty} \frac{3x^7 - 7x + 9}{7x^3 - 4} =$



b) $\lim_{x \rightarrow -\infty} \frac{3x^7 - 7x + 9}{7x^3 - 4} =$

$$7. \lim_{x \rightarrow \infty} \frac{3x^{\frac{5}{2}} + 7x^{-\frac{1}{2}}}{x - x^{\frac{1}{2}}} =$$

$$8. \lim_{x \rightarrow \infty} \frac{x}{\sqrt{x^2 + 1}} =$$

$$\lim_{x \rightarrow -\infty} \frac{x}{\sqrt{x^2 + 1}} =$$

$$9. \lim_{x \rightarrow \infty} \frac{x}{\sqrt{x^3 + 1}} =$$

$$\lim_{x \rightarrow -\infty} \frac{x}{\sqrt{x^3 + 1}} =$$