



Problem Set 3: Limits at Infinity

Find the limits at infinity for the following polynomial functions:

1. $\lim_{x \rightarrow \infty} \frac{2x + 3}{5x + 6}$

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

3. $\lim_{x \rightarrow -\infty} \frac{2x^3 - 4}{x^3 - x^2 - x + 1}$

4. $\lim_{x \rightarrow -\infty} \frac{x^2 + 12x - 6}{3(x + 1)}$

5. $\lim_{x \rightarrow \infty} \frac{-x^5}{3x^5 + 6x^3 - 2x}$

6. $\lim_{x \rightarrow \infty} \frac{x^2 + 3x + 4x^3}{4x + 7x^2 - 1}$

AP Calculus AB – Unit 1



Find the limits at infinity for the following functions with square roots:

7. $\lim_{x \rightarrow \infty} \frac{\sqrt{3x^2 + 1}}{x - 4}$

8. $\lim_{x \rightarrow -\infty} \frac{\sqrt{x^2 + x - 10}}{6x - 4}$

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Find the horizontal asymptotes (if any) for the following functions:

$$9. \quad f(x) = \frac{7x^3 - 6x + 1}{-4x^2 - 3x - 13}$$

$$10. \quad y = \frac{-2(2x + 8)}{(x - 1)(3x - 4)}$$

$$11. \quad f(x) = \begin{cases} \frac{x + 1}{2x - 4}, & x \geq 5 \\ \frac{5}{x + 2}, & x < 5 \end{cases}$$

$$12. \quad y = \begin{cases} \frac{7(x - 2)}{8x^2 + x + 2}, & x > 0 \\ \sqrt{2x}, & x \leq 0 \end{cases}$$