

AP Calculus AB: 2.4 Limits to Infinity Analytically

1)  $\lim_{x \rightarrow -2} 2x^3 - 3x + 1 = -9$

3)  $\lim_{x \rightarrow -2} 2^x + \frac{x}{4} = -\frac{1}{4}$

5)  $\lim_{x \rightarrow -\infty} 5x^2 - 7x + 2 = \infty$

7)  $\lim_{x \rightarrow -\infty} \frac{3x^3 - 4x + 5}{x - 2x^5 - 1} = 0$

9)  $\lim_{x \rightarrow \infty} \frac{x+1}{3x-8} = \frac{1}{3}$

11)  $\lim_{x \rightarrow \infty} \frac{2x^3 + 1}{e^x} = 0$

13)  $\lim_{x \rightarrow -\infty} \frac{-x}{\sqrt{x^2 - 5}} = 1$

15)  $\lim_{x \rightarrow \infty} \frac{8x^2}{6x - 4x^2 + 3} = -2$

17)  $\lim_{x \rightarrow \infty} \frac{8x^3}{5x^2 + 3} = \infty$

19)  $\lim_{x \rightarrow \infty} \frac{2^{-x}}{5x^2 + 3} = 0$

21)  $\lim_{x \rightarrow \infty} \frac{\frac{1}{x}}{2x^2 - 5x} = \frac{1}{2x^3 - 5x^2} = 0$

2)  $\lim_{x \rightarrow 4} \frac{x}{x-4} = DNE$

4)  $\lim_{x \rightarrow \frac{5\pi}{3}} \sec(x) = 2$

6)  $\lim_{x \rightarrow \infty} \frac{x+2}{x^2-16} = 0$

8)  $\lim_{x \rightarrow \infty} \frac{2x^2 + 4}{5 - 3x^2} = -\frac{2}{3}$

10)  $\lim_{x \rightarrow -\infty} \frac{3x^2 + 14x + 8}{x+4} = -\infty$

12)  $\lim_{x \rightarrow \infty} \frac{\sqrt{x^2 - 4}}{2x + 3} = \frac{1}{2}$

14)  $\lim_{x \rightarrow -\infty} \frac{\sqrt{x^2 - 4}}{2x + 3} = -\frac{1}{2}$

16)  $\lim_{x \rightarrow -\infty} \frac{5x^3 - 4x^2 + 2x + 13}{7x^2 - 10x + 5} = -\infty$

18)  $\lim_{x \rightarrow -\infty} \frac{8x^3}{5x^2 + 3} = -\infty$

20)  $\lim_{x \rightarrow \infty} 3^{\frac{1}{x}} = 1$  ← similar to  $3^0 = 1$

22) If the function  $y = \frac{ax+b}{x+c}$  has a vertical asymptote at  $x=1$  and a horizontal asymptote at  $y=-3$ . What is  $a+c = \underline{-4}$ ?