$\boxed{11C}$ # 1k

$$\lim_{n\to\infty} \frac{\sum_{k=0}^{n} (2k-1)}{2n^2+1} = \lim_{n\to\infty} \frac{\overbrace{(n+1)(2n-2)}^{\boxed{2n^2}}}{\underbrace{2(2n^2+1)}_{\boxed{4n^2}}} = \frac{1}{2}$$

Numerator: $\sum_{k=0}^{n}(2k-1) = -1 + 1 + 3 + \cdots + (2n-1)$

$$= \frac{n+1}{2}(2n-2)$$

1l

$$\sum_{k=0}^{n} 2^{k-1} = \frac{1}{2} + 1 + 2 + \cdots + 2^{n-1}$$

$$= \frac{\frac{1}{2}(1-2^n)}{1-2} = \frac{1}{2}(2^n-1)$$

$$\lim_{n\to\infty} \frac{\frac{1}{2}(2^n-1)}{3^n} = 0$$

$\boxed{1D}$ #2c

$y = \frac{3x+1}{x+1}$

$x < -2$

x-int $-1/3$

y-int 1

VA $x = -1$

HA $y = 3$

$y(-2) = \frac{-6+1}{-1}$

$y(-2) = \_\_\_$

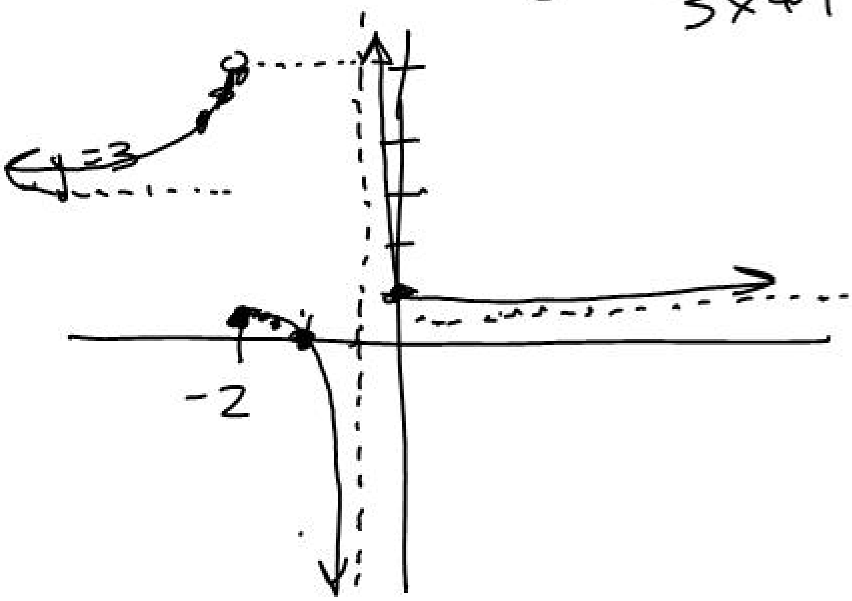
$y = \frac{x+1}{3x+1}$

x-int -1

y-int 1

VA $x = -1/3$

HA $y = 1/3$



$\lim_{x \to -2^-} f(x) = 5$

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

$\lim_{x \to -2} f(x)$ dne

Rev #1e

$\boxed{2n^2}$

$\lim_{n \to \infty} \frac{\overbrace{1+2+3+\cdots+2n}}{n^2} = \lim_{n \to \infty} \frac{n(1+2n)}{\boxed{n^2}}$

$= 2$

$$f\ 2\sum_{k=1}^{n} \cancel{\ln}\, 3^k = 2 \cdot \frac{3(1-3^n)}{1-3}$$

$$= 3(3^n - 1)$$

$$\lim_{n\to\infty} \frac{3(3^n-1)}{5^n} = 0$$

L'Hôpital's Rule

$$\lim_{x\to\infty} \frac{x^3}{2^x} = \lim_{x\to\infty} \frac{3x^2}{2^x \cdot \ln 2}$$

$\frac{\infty}{\infty}$ indeterminate form $\qquad \frac{\infty}{\infty}$

$$= \lim_{x\to\infty} \frac{6x}{2^x(\ln 2)^2} = \lim_{x\to\infty} \frac{6}{2^x(\ln 2)^3}$$

$\frac{\infty}{\infty}$

$$= 0$$

L'Hospital

$$\lim_{n\to\infty}\left(1-\frac{3}{n}\right)^{2n} = e^{-6}$$

$$a \cdot \ln b = \ln b^{a}$$

$$\boxed{1^{\infty}}$$

$$\lim_{n\to\infty} \ln\left(1-\frac{3}{n}\right)^{2n} = \lim_{n\to\infty} \underbrace{2n}\cdot \underbrace{\ln\left(1-\frac{3}{n}\right)}$$

$$\boxed{\infty \cdot 0}$$

$$-3n^{-1}$$

$$= \lim_{n\to\infty} \frac{2\ln\left(1-\frac{3}{n}\right)}{\frac{1}{n}} \overset{L'H}{=} \lim_{n\to\infty} \frac{\frac{2}{\left(1-3/n\right)}\cdot\frac{3}{\cancel{n^2}}}{-\frac{1}{\cancel{n^2}}}$$

$$\boxed{\frac{0}{0}}$$

$$n^{-1}$$

$$2$$

$$= -6$$

Ex. $\lim_{x\to\infty} \cancel{x}\cdot\tan\left(\frac{1}{x}\right) = \lim_{x\to\infty} \frac{\tan\frac{1}{x}}{\frac{1}{x}}$

$\boxed{\infty\cdot 0}$ $\qquad \boxed{\frac{0}{0}}$

$\frac{1}{x} = x^{-1}$

$-x^{-2} = \frac{-1}{x^2}$

$\overset{LH}{=} \lim_{x\to\infty} \frac{\sec^2\left(\frac{1}{x}\right)\cdot \cancel{\frac{-1}{x^2}}}{\cancel{\frac{-1}{x^2}}}$

$= 1$

Ex $\lim_{x\to\infty} \left(\sqrt{x^2-x} - x\right) \frac{\left(\sqrt{x^2-\cancel{x}} + x\right)}{\sqrt{x^2-x}+x}$

$\cancel{x^2} - x \qquad -\cancel{x^2}$

$\boxed{\infty - \infty}$

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

$\frac{-\infty}{\infty}$

$= \lim_{x\to\infty} \frac{-1}{\frac{1}{2}(x^2-x)^{-1/2}\cdot(2x-1)+1}$

$$\lim_{x\to\infty} \frac{-1}{\dfrac{2x-1}{2(x^2-x)} + \dfrac{2(x^2-x)}{2(x^2-x)}}$$

$$= \lim_{x\to\infty} \frac{-2(x^2-x)}{2x^2-1} = \lim_{x\to\infty} \frac{-2x^2+2x}{2x^2-1}$$

$$= -1$$