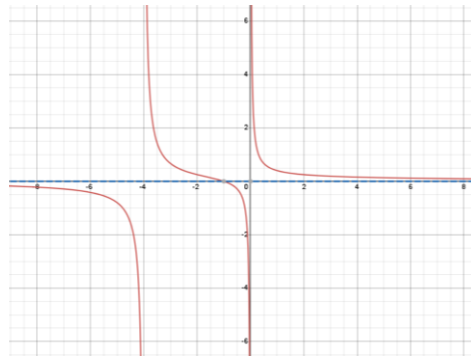


## ASYMPTOTES

$$R(X) = \frac{ax^n + L}{bx^m + L}$$

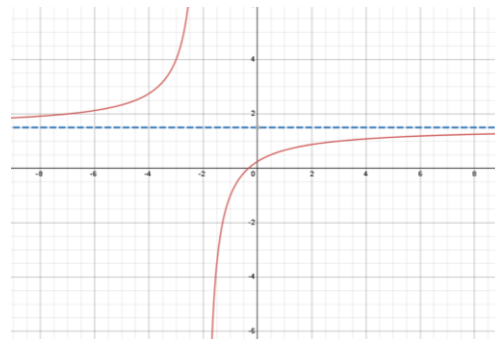
1.  $n < m$ : **Horizontal Asymptote** ( $y = 0$ )



$$R(x) = \frac{x+1}{x(x+4)} = \frac{x+1}{x^2+4x} \quad n=1, m=2$$

HA:  $y = 0$

2.  $n = m$ : **Horizontal Asymptote** ( $y = \frac{a}{b}$ )



$$R(x) = \frac{3x+1}{2x+4} \quad n = 1, m = 1$$

HA:  $y = \frac{3}{2}$

**3.  $n = m + 1$ : Oblique (Slant) Asymptote ( $y = \frac{a}{b}x + c$ )**

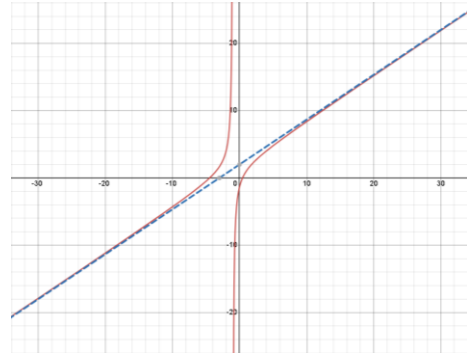
**Requires Long Division – Results in Linear Equation ( $y=mx+b$ )**

$$R(x) = \frac{2x^2 + 8x - 4}{3x + 3}$$

$$n = 2, m = 1$$

$$\text{OA: } y = \frac{2}{3}x + 2$$

$$\begin{array}{r} \frac{2}{3}x + 2 \\ 3x + 3 \overline{) 2x^2 + 8x - 4} \\ \underline{2x^2 + 2x} \phantom{- 4} \\ 6x - 4 \\ \underline{6x + 6} \\ -10 \end{array}$$



**4.  $n > m + 1$ :**

**No Horizontal Asymptote**

**No Oblique (Slant) Asymptote**

$$R(x) = \frac{3x^4 + 2x^3 + 4x^2 + 2x + 1}{2x^2 + 4x + 3}$$

$$n = 4, m = 2$$