More Asymptotes

Vertical

$\lim_{x \to \#} f(x) = \pm\infty$

↑ where denom = 0

Horiz

$\lim_{x \to \pm\infty} f(x) = \#$

Slant = numerator is one power higher

Curvilinear = numerator is two or more powers higher

↳ Find by using long division.

$$f(x) = \frac{4x^3 - 3x^2 - 5}{2x^2 + x + 3}$$

Slant

$$\begin{array}{r} 2x - \frac{5}{2} \\ 2x^2+x+3 \overline{)\,4x^3 - 3x^2 + 0x - 5} \\ \underline{-4x^3 + 2x^2 + 6x} \\ -5x^2 - 6x - 5 \end{array}$$

$y = 2x - 5/2$

$\lim_{x \to \pm\infty} f(x) = 3$ Horiz $y = 3$

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

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

$f(-5) = 1 \quad f(0) = -8 \quad f(2) = -1$

$f(3) = -3 \quad f(5) = 2 \quad f(7) = 6$

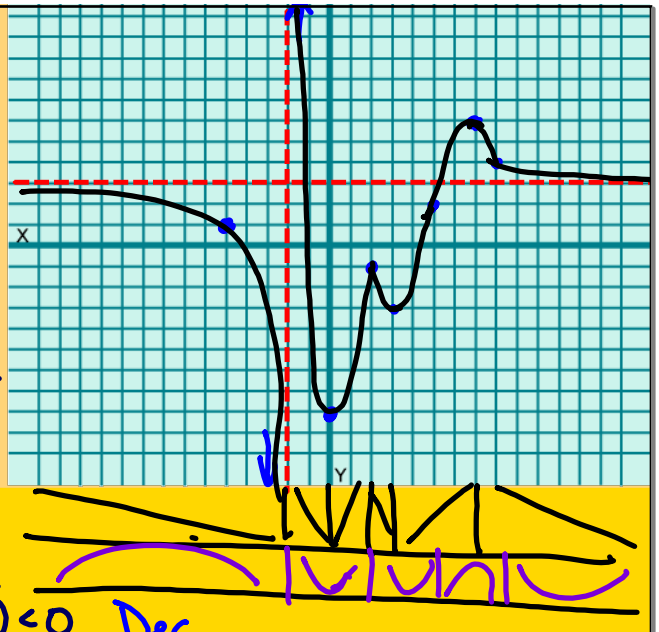
$f(8) = 4$

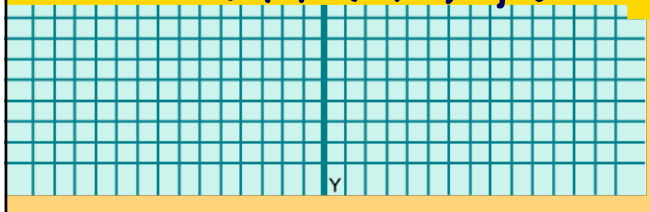
$(-\infty, -2)\ (-2, 0)\ (2, 3)\ (7, \infty)\ f'(x) < 0$ Dec.

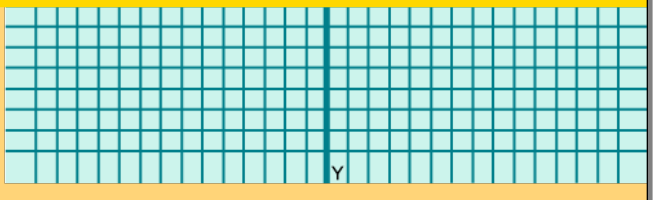
$(0, 2)\ (3, 7)\ f'(x) > 0$ Inc

$(-\infty, -2)\ (5, 8)\ f''(x) < 0$ ∩

$(-2, 2)\ (2, 5)\ (8, \infty)\ f''(x) > 0$ ∪





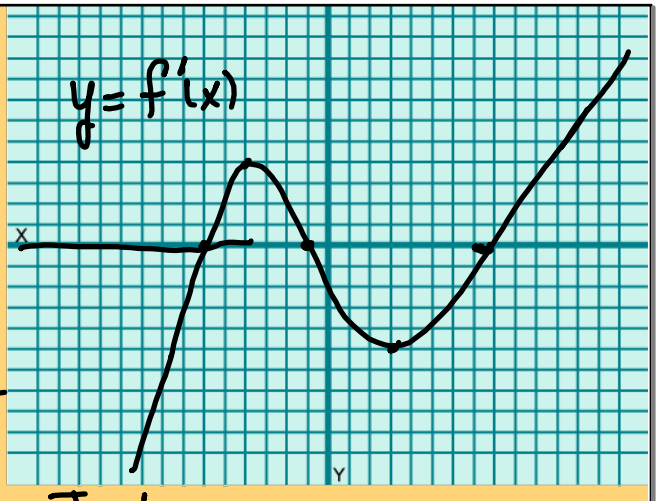


1) Find crit pts.
$f'(x) = 0$ x-intercepts

$x = -6, -1, 8$

− | + | − | +

-6 -1 8



2) Test Pts – where f' = +/− above/below x-axis

3) Rel. Extrema – Mountain Test

-6 -1 8

Infl Pts. = peaks & valleys of f'

$-4, 3$

Concavity = where graph of f' is inc/dec.

U | ∩ | U

-4 3