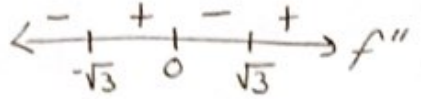
1.

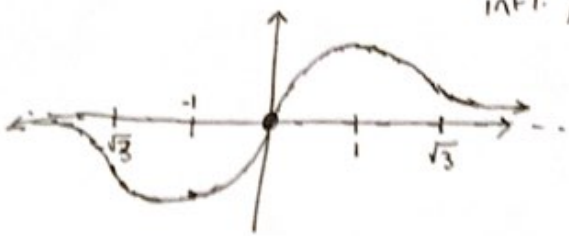
- Domain f: $(-\infty, \infty)$
- Symmetry: $f(x)$ is odd, so f has origin symmetry. (We will discuss this tomorrow)
- Intercepts: $(0,0)$
- Asymptotes: · Vertical: None
  · Slant: None
  · Horizontal: $\lim_{x\to\infty} f(x) = 0$, $\lim_{x\to-\infty} f(x) = 0$

  $y = 0$

f incr: $(-1, 1)$
f decr: $(-\infty, -1) \cup (1, \infty)$
Local min @ $x = -1$
Local max @ $x = 1$



f con ↑: $(-\sqrt{3}, 0) \cup (\sqrt{3}, \infty)$
f con ↓: $(-\infty, -\sqrt{3}) \cup (0, \sqrt{3})$
infl. pts @ $x = \pm\sqrt{3}$, $x = 0$



con ↑, decr: $(-\sqrt{3}, -1) \cup (\sqrt{3}, \infty)$
con ↑, incr: $(-1, 0)$
con ↓ incr: $(0, 1)$
con ↓, decr: $(-\infty, -\sqrt{3}) \cup (1, \sqrt{3})$

2. $f(x) = \dfrac{4x^2 - 3}{x - 4}$

VA: $x = 4$

HA: None. since $\lim_{x\to\infty} f(x) = \infty$

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

Slant: Since numerator degree is one larger than denominator degree, we have a slant asymptote.

$$\begin{array}{r} 4x + 16 \\ x-4 \,\overline{)\, 4x^2 - 3} \\ -(4x^2 - 16x) \\ \hline 16x - 3 \\ -(16x - 64) \\ \hline 61 \end{array}$$

← Remainder

Slant Asymptote:
$y = 4x + 16$