Name: Key Period: ____

CURVE SKETCHING PRACTICE

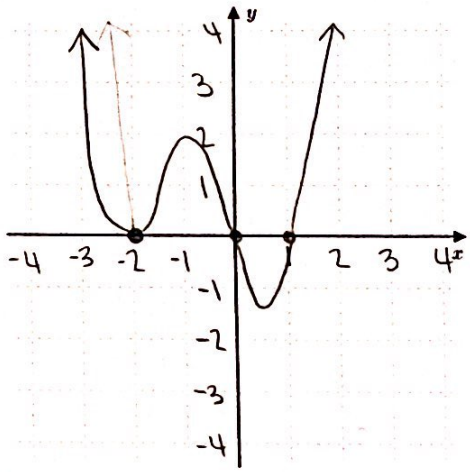
Curve Sketching

1. Give the domain (watch for denominator restrictions, radical restrictions).
2. Reduce $f(x)$. Oftentimes, you must factor before you reduce.
3. Find vertical asymptotes (denominator restrictions after reducing) and holes.
4. Give x and y intercepts.
5. Find the end behavior (horizontal asymptotes or other) using highest degree terms of the numerator and the denominator.
6. Find a starting point. (If needed.)
7. Graph.

Practice:

Use the curve sketching recipe to sketch the following curves.

1. $f(x) = x(x-1)(x+2)^2$



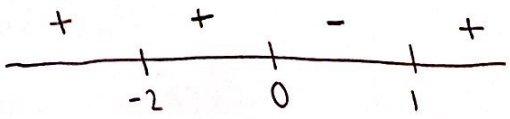
Domain: $x \in (-\infty, \infty)$

y-int: $(0,0)$

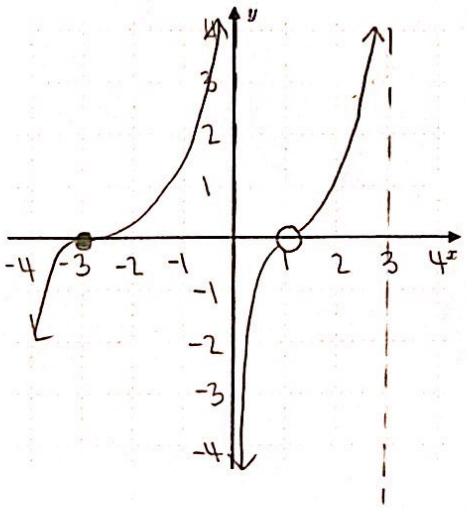
$f(0) = 0(0-1)(0+2)^2 = 0$

x-int: $(0,0)$ $(1,0)$ $(-2,0)$

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



2. $g(x) = \frac{x(x-1)^2(x+3)^3}{x^2(x-1)(x-3)^2}$



Domain: $\{x \in \mathbb{R} : x \neq 0, 1, 3\}$

$g_{red}(x) = \frac{(x-1)(x+3)^3}{x(x-3)^2}$

V.A.: $x = 0$ & $x = 3$

Holes: $x = 1 \quad (1, 0)$

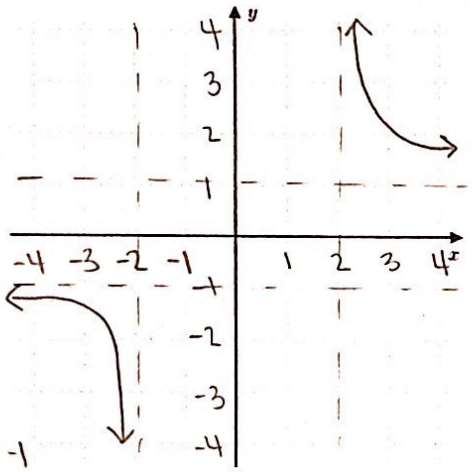
x-int.: $(-3, 0)$

y-int.: N/A

End Behavior: $\lim_{x \to \infty} g(x) = \infty$

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

3. $y = \frac{x+1}{\sqrt{x^2-4}}$



Domain: $\{x \in \mathbb{R} : x \neq (-2, 2)\}$

Holes: N/A

V.A.: $x = 2$ & $x = -2$

x-int.: N/A

y-int.: N/A

Starting Point: N/A

End Behavior: $\lim_{x \to \infty} \frac{x+1}{\sqrt{x^2-4}} = 1$ $\lim_{x \to -\infty} \frac{x+1}{\sqrt{x^2-4}} = -1$

consider:

$\lim_{x \to \infty} \frac{x}{\sqrt{x^2}} = \lim_{x \to \infty} \frac{x}{|x|} = 1$

$\lim_{x \to -\infty} \frac{x}{|x|} = -1$