Calculus AB

3-6

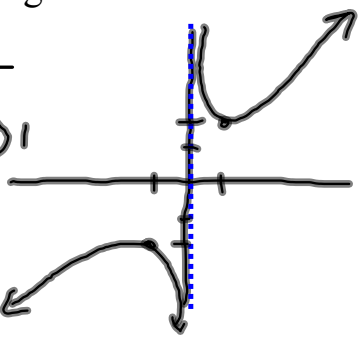
Curve Sketching

Find each of the following and sketch.

15) $f(x) = \dfrac{x^2+1}{x}$

$F'(x) = \dfrac{2x\cdot x - (x^2+1)1}{x^2}$

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



c.p. $(1, 2)$ $F''(1) = 2 \Rightarrow$ min

$(-1, -2)$ $F''(-1) = -2 \Rightarrow$ max

$F''(x) = \dfrac{2x(x^2) - (x^2-1)(2x)}{x^4}$

$= \dfrac{2x^3 - 2x^3 + 2x}{x^4} = \dfrac{2}{x^3}$

$0 = \dfrac{2}{x^3}$ nonp

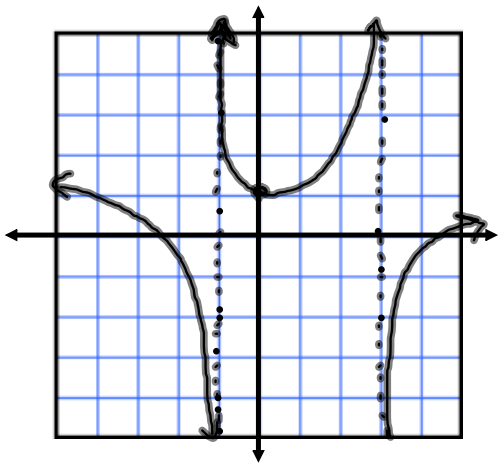
undef. at 0

Domain	$\mathbb{R}$ except $\{0\}$
Range	$(-\infty, -2] \cup [2, \infty)$
Horizontal Asymptotes	none
Vertical Asymptotes	$x = 0$
zeros	$\varnothing$
y-intercepts	none
relative mins	$(1, 2)$
relative maxs	$(-1, -2)$
Points of Inflection	change at $x = 0$
Increasing Interval	$(-\infty, -1) \cup (1, \infty)$
Decreasing Interval	$(-1, 0) \cup (0, 1)$
Concave Up	$(0, \infty)$
Concave Down	$(-\infty, 0)$

Sketch a graph for the following information. (0,1) c.p.

x	$(-\infty,-1)$	-1	$(-1,0)$	0	$(0,3)$	3	$(3,\infty)$
$f(x)$		$\varnothing$		1		$\varnothing$	
$f'(x)$	decr. $-$	$\varnothing$	decr. $-$	c.p. 0	incr. $+$	$\varnothing$	incr. $+$
$f''(x)$	$-$ concave down	$\varnothing$	$+$ concave up	$+$	$+$	$\varnothing$	$-$

*1a) Given vertical asymptotes at $x = -1$ and $x = 3$.



Sketch a graph for the following information.

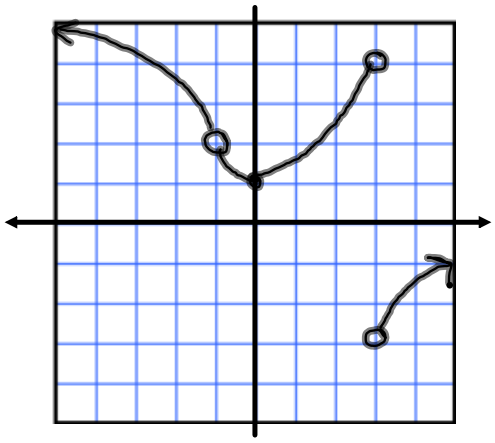
x	$(-\infty,-1)$	-1	$(-1,0)$	0	$(0,3)$	3	$(3,\infty)$
$f(x)$		$\varnothing$		1		$\varnothing$	
$f'(x)$	$-$	$\varnothing$	$-$	0	$+$	$\varnothing$	$+$
$f''(x)$	$-$	$\varnothing$	$+$	$+$	$+$	$\varnothing$	$-$

*1b) Given

$\lim_{x \to -1} f(x) = 2$

$\lim_{x \to 3^-} f(x) = 4$

$\lim_{x \to 3^+} f(x) = -3$



Assignment

Pg. 208

1-4,

8-36 (every 4th),

and Handout