

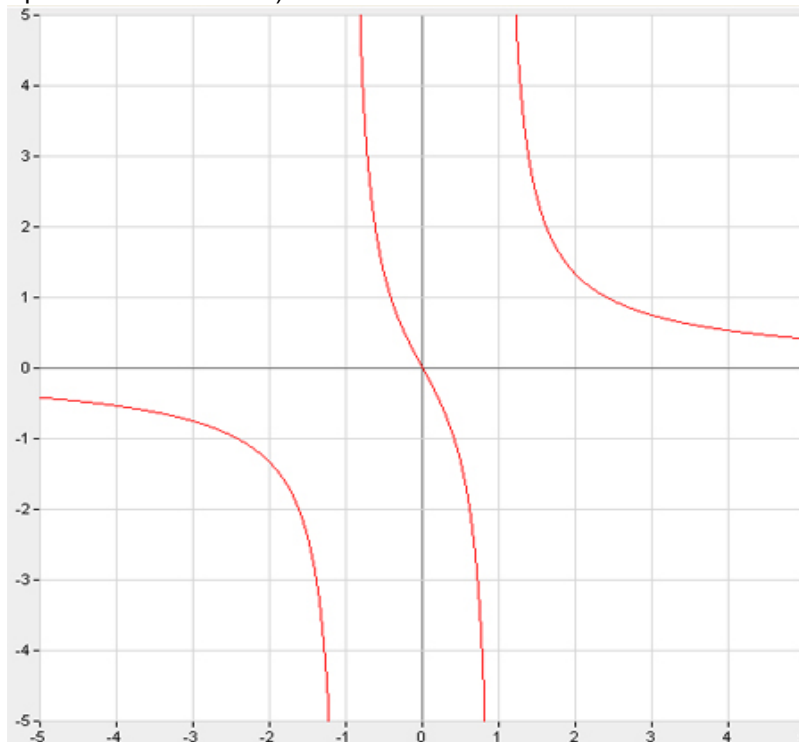
$f(x) = \frac{2x}{x^2 - 1}$	$f'(x) = \frac{-2(x^2 + 1)}{(x^2 - 1)^2}$	$f''(x) = \frac{4x(x^2 + 3)}{(x^2 - 1)^3}$	
Horizontal Asymptotes:	$y = 0$	Vertical Asymptotes:	$x = 1, -1$
X Intercepts:	$x = 0$	Y Intercepts:	$y = 0$
Critical Values:	1, -1	Points of Inflection:	0
Intervals:	$(-\infty, -1)(-1, 0)(0, 1)(1, \infty)$	Symmetry:	origin
Slant Asymptote:	none	***NOTE*** - The second derivative was incorrectly printed... SEE BELOW	

Write each interval and critical value in the Intervals column and fill out the table for each interval.

Intervals	Test Value	Sign of $f(x)$	Sign of $f'(x)$	Sign of $f''(x)$	Characteristic of Curve
$(-\infty, -1)$	-2		neg.	neg.	Decreasing, Concave Down
-1	-1	und	und	und	Vertical Asymptote
$(-1, 0)$	-0.5		neg.	pos.**	Decreasing, Concave Up
0	0	0	neg.	0	Point of inflection
$(0, 1)$	0.5		neg.	neg.	Decreasing, Concave Down
1	1	und	und	und	Vertical Asymptote
$(1, \infty)$	2		neg.	pos.	Decreasing, Concave Up

**\*\*NOTE - The second derivative was incorrectly printed as  $(x^2 - 1)^4$  it should be  $(x^2 - 1)^3$**

Graph (Show asymptotes as dotted lines):

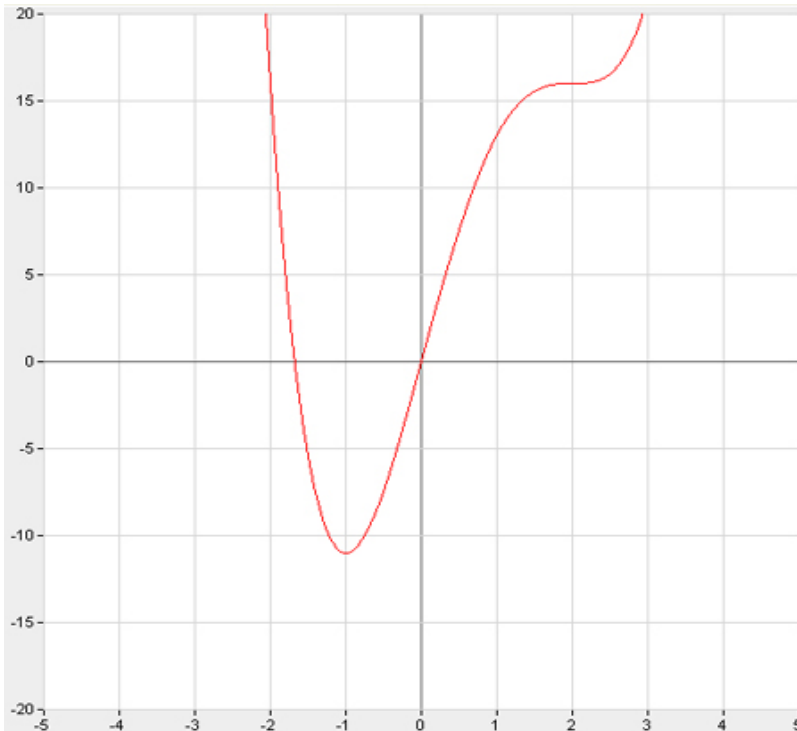


$f(x) = x^4 - 4x^3 + 16x$	$f'(x) = (x+1)(x-2)(x-2)$	$f''(x) = 12x(x-2)$	
Horizontal Asymptotes:	none	Vertical Asymptotes:	none
X Intercepts:	0 and -1.68	Y Intercepts:	0
Critical Values:	-1, 2	Points of Inflection:	0 and 2
Intervals:	$(-\infty, -1)(-1, 0)(0, 2)(2, \infty)$	Symmetry:	none
Slant Asymptote:	none		

Write each interval and critical value in the Intervals column and fill out the table for each interval.

Intervals	Test Value	Sign of $f(x)$	Sign of $f'(x)$	Sign of $f''(x)$	Characteristic of Curve
$(-\infty, -1)$	-2		neg.	pos.	Decreasing, Concave up
-1	-1	-11	0	pos.	Minimum
$(-1, 0)$	-0.5		pos.	pos.	Increasing Concave Up
0	0	0	pos.	0	Point of Inflection
$(0, 2)$	1		pos.	neg	Increasing, Concave Down
2	2	16	0	0	Point of Inflection (Wiggle)
$(2, \infty)$	3		pos.	pos.	Increasing Concave Up

Graph (Show asymptotes as dotted lines):



$f(x) = \frac{x^2 + 1}{x}$	$f'(x) = \frac{x^2 - 1}{x^2}$	$f''(x) = \frac{2}{x^3}$	
Horizontal Asymptotes:	none	Vertical Asymptotes:	$x=0$
X Intercepts:	none	Y Intercepts:	none
Critical Values:	-1, 0, 1	Points of Inflection:	none
Intervals:	$(-\infty, -1)(-1, 0)(0, 1)(1, \infty)$	Symmetry:	origin
Slant Asymptote:	$y=x$		

Write each interval and critical value in the Intervals column and fill out the table for each interval.

Intervals	Test Value	Sign of $f(x)$	Sign of $f'(x)$	Sign of $f''(x)$	Characteristic of Curve
$(-\infty, -1)$	-2		pos.	neg.	Increasing, Concave Down
-1	-1	-2	0	neg.	Maximum
$(-1, 0)$	-0.5		neg.	neg.	Decreasing, Concave Down
0	0	und	und	und	Vertical Asymptote
$(0, 1)$	0.5		neg.	pos.	Decreasing, Concave Up
1	1	2	0	pos.	Minimum
$(1, \infty)$	2		pos.	pos.	Increasing, Concave Up

Graph (Show asymptotes as dotted lines):



#77 Plug the equation for  $x - \frac{f(x)}{f'(x)}$  nto the calculator:

```

Plot1 Plot2 Plot3
\Y1=X-(X^3-3X-1)
)/ (3X^2-3)
\Y2=
\Y3=
\Y4=
\Y5=
\Y6=
    
```

Set table to ask and start with x=2

X	Y1
2	1.8889
1.8889	1.8795
1.8795	1.8794
1.8794	1.8794

X=

Answer is x=1.879

#78

```

Plot1 Plot2 Plot3
\Y1=X-(X^3+2X+1)
)/ (3X^2+2)
\Y2=
\Y3=
\Y4=
\Y5=
\Y6=
    
```

Answer: x=-.453

Table:

X	Y1
-1	-.6
-.6	-.4649
-.4649	-.4535
-.4535	-.4534
-.4534	-.4534

X=

#81

$y = x(1 - \cos x)$  product rule  
 $dy = 1(1 - \cos x) + x(\sin x)$   
 $dy = (1 - \cos x + x \sin x)dx$

#82

$y = \sqrt{36 - x^2}$  chain rule  
 $y = (36 - x^2)^{\frac{1}{2}}$   
 $dy = \frac{1}{2}(36 - x^2)^{-\frac{1}{2}} \cdot (-2x)dx$   
 $dy = -x(36 - x^2)^{-\frac{1}{2}}dx$   
 $dy = \frac{-x}{\sqrt{36 - x^2}}dx$