$\frac{3x^3+x^2+x+2}{x^2+2x}$

$x^2+2x \;\overline{)\; 3x^3+x^2+x+2}$ quotient $3x-5$

$\frac{3x^3}{x^2}=3x$

$-(3x^3+6x^2)$

$-5x^2$

$\frac{-5x^2}{x^2}=-5$

$y=3x-5$ is slant Asymptote.

Chapter 3, particularly Section 3.6, in College Algebra, can help a lot with your graphing.

3.6 is all rational functions.

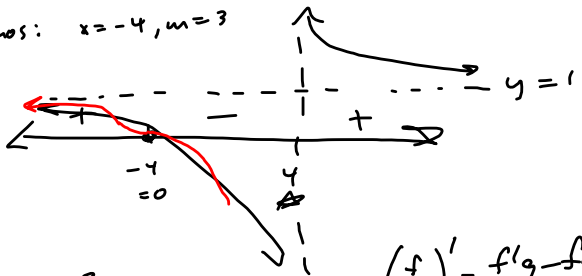
Use the guidelines of this section to sketch the curve.

15 $y=\frac{(x+4)^3}{(x-4)^2}$ $x\to\pm\infty$ $\Rightarrow$ $y=1$ = H.A.

Section 3.5

$D=\mathbb{R}\setminus\{4\}$ V.A. $x=4$, $m=3$

zeros: $x=-4$, $m=3$



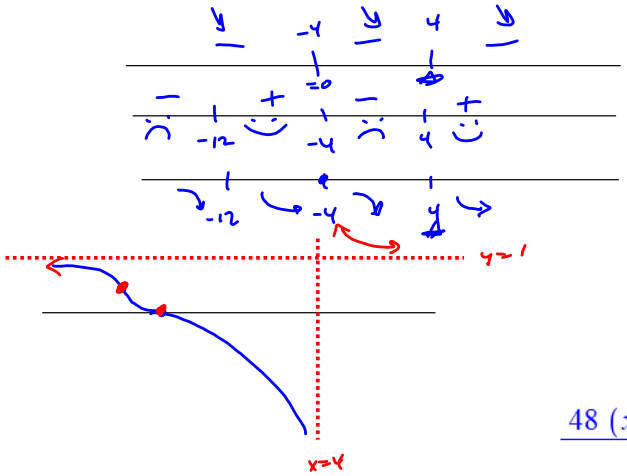
$\left(\frac{f}{g}\right)'=\frac{f'g-fg'}{g^2}$

$y=\frac{(x+4)^3}{(x-4)^3}$

$y'=\frac{3(x+4)^2(x-4)^3-(x+4)^3(3(x-4)^2)}{(x-4)^6}$

$=\frac{3(x+4)^2(x-4)^2\left[x-4-(x+4)\right]}{}$

$=\frac{3(x+4)^2(x-4)^2(-8)}{(x-4)^6}=\frac{-24(x+4)^2}{(x-4)^4}$



$\frac{48(x+4)(x+12)}{(x-4)^5}$

$r''(6)=\frac{48(4)(12)}{(-4)^5}$

$r(x) = \frac{(x+4)^3}{(x-4)^2} = \frac{x^3+(3)(4x^2)+3(16x)+64}{x^2-8x+16}$

$x+20$

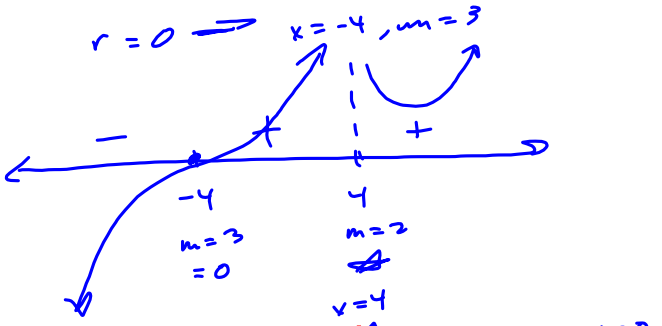
$x^2-8x+16 \;\overline{)\; x^3+12x^2+48x+64}$

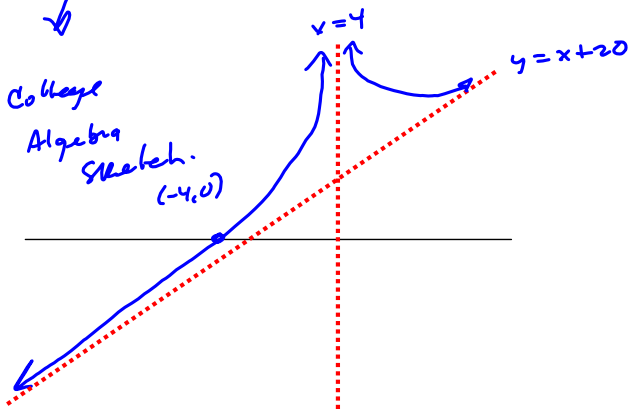
$-(x^3-8x^2+16x)$

$20x^2+32x+64$

$\frac{x^3}{x^2}=x$

$x+20=y$ S.A.

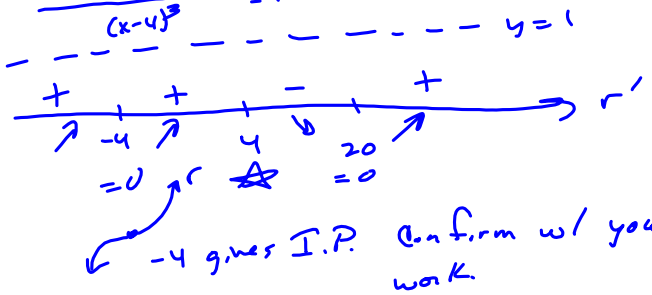




$r' = \frac{3(x+4)^2(x-4)^2-(x+4)^3(2(x-4))}{(x-4)^4}$

$= \frac{(x+4)^2(x-4)[3(x-4)-(2(x+4)]}{(x-11)^4} = \frac{(x+4)^2(x-4)(3x-12-2x-8)}{(x-4)^4} \to 3$

$= \frac{(x+4)^2(x-20)}{(x-4)^3} = r'$



-4 gives I.P. Confirm w/ your work.

3.6 notes and video for College Algebra might be very helpful.