APCalc
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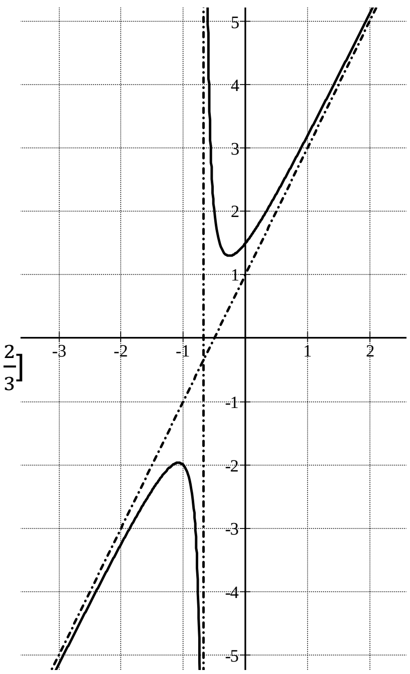
Date:________________

Unit 3: Applications of Differentiation
3.6 Curve Sketching II (Slant Asymptotes)

Rational functions that have a numerator exactly one degree larger than the denominator will have a *slant asymptote*.

To identify the slant asymptote perform the division, the quotient is the equation of the asymptote.



ex. $f(x) = \frac{6x^2+7x+3}{3x+2}$

*divide using long division

$$
\begin{array}{r l}
 & 2x + 1 \leftarrow \text{quotient} \\
3x + 2 & \overline{\big) 6x^2 + 7x + 3} \\
 & \underline{6x^2 + 4x} \\
 & \quad\quad 3x + 3 \\
 & \quad\quad \underline{3x + 2} \\
 & \quad\quad\quad\quad 1
\end{array}
$$

Thus, $y = 2x + 1$ is a slant asymptote. [As well as a vertical asymptote $x = -\frac{2}{3}$]

Then, continue with the rest of the analysis as in 3.5 to sketch the graph.

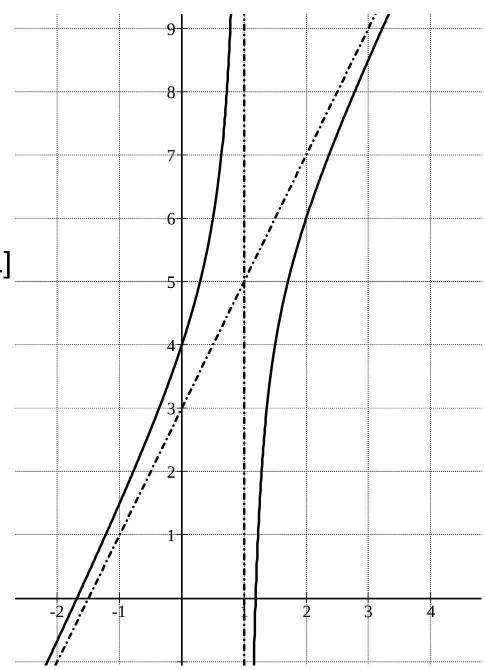
ex. $f(x) = \frac{2x^2+x-4}{x-1}$

*divide using synthetic division

$$
\begin{array}{c|ccc}
1 & 2 & 1 & -4 \\
 & \downarrow & 2 & 3 \\
\hline
 & \underbrace{2 \quad 3}_{\text{Quotient}} & & -1
\end{array}
$$

Thus, $y = 2x + 3$ is a slant asymptote. [As well as a vertical asymptote $x = 1$]

Then, continue with the rest of the analysis as in 3.5 to sketch the graph.



Practice Questions

Pg. 203/ # 35, 37, 39, 40