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## 2020 Curves Assignment

1. Identify the intervals of increase and decrease for $y=f(x)$ given $f^{\prime}(x)=\frac{x-5}{(x-2)^{2}}$.
2. Identify the intervals of concave up and concave down for $y=f(x)$ given $f^{\prime \prime}(x)=\frac{x^{2}-2 x-15}{x^{2}+1}$.
3. For the curve $y=3 x^{4}-4 x^{3}-54 x^{2}+108 x$, find the local maximum and/or minimum values using the first and/or second derivatives.
4. For the curve $f(x)=x^{4}-6 x^{2}+9$
a) Find the intervals of concavity.
b) Find any inflection points.
5. Given, $f(x)=\frac{5 x^{2}-3 x-8}{x^{2}-9}$

Determine the equation for the vertical and horizontal asymptotes of the function.
6. Sketch the function given:

The domain is $(-\infty, 9]$. The $x$-intercepts are 0 and 9 . The horizontal asymptote is the line $y=-2$. There are no vertical asymptotes. The interval of increase is $(-\infty, 5)$. The interval of decrease is $(5,9)$. The absolute maximum value is where $f(x)=8$. The function is concave upward $(-\infty, 2)$ and concave downward $(2,9)$. The point of inflection is $(2,5)$.


