Mathematics 1375/D572, Spring 2019 **Quiz #6**
Instructor: Suman Ganguli **Friday, March 29** **Name:** _____

Consider the rational function $f(x) = \dfrac{6x-18}{2x-3}$.

1. (2 points) What is the domain of $f(x)$? Show your calculations, and write the solution in interval notation:

> **Solution:** $2x - 3 = 0$ for $x = 3/2$. Hence the domain of f is $\mathbb{R} - \{3/2\} = (-\infty, 3/2) \cup (3/2, \infty)$

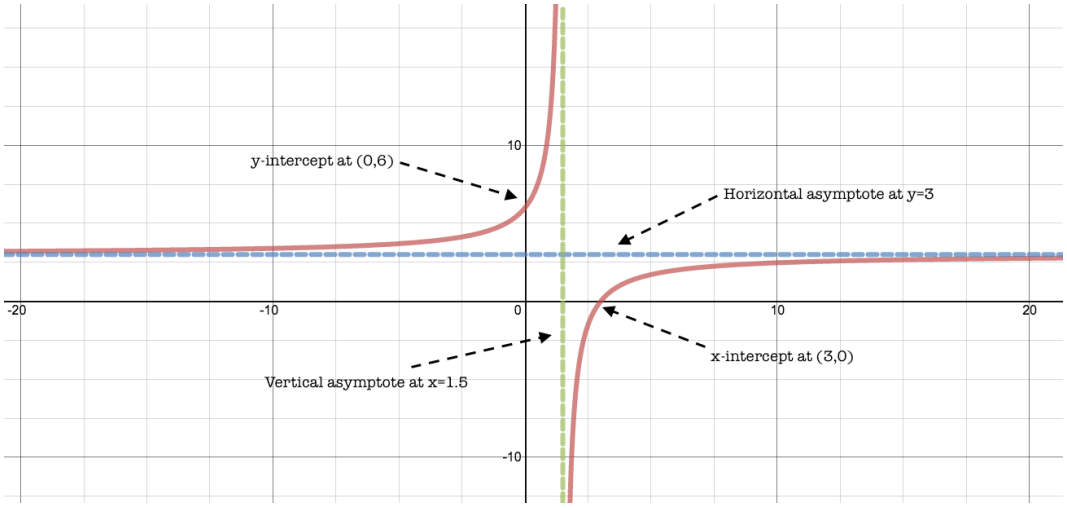
2. (2 points) Algebraically solve for the the $x-$ and $y-$intercepts of the graph of $f(x)$. Again, show the necessary calculations, and write the coordinates of the intercepts in (x, y) form:

> **Solution:**
> The $x-$intercept occurs when $6x - 18 = 0$, hence at $x = 3$, i.e., at the point $(3, 0)$
> The $y-$intercept occurs at $f(0) = \dfrac{-18}{-3} = 6$, i.e., at the point $(0, 6)$

3. (1 point) What is the vertical asymptote of this function?

> **Solution:** The vertical asymptote occurs when $2x - 3 = 0$, i.e., the vertical line $x = 3/2$.

4. (3 points) Sketch a complete graph of the function. You can use Desmos or a graphing calculator for help. But indicate and label on your graph below the x- and y-intercepts, and the vertical asymptote (draw the vertical asymptote as a dashed line, and label it with its equation).



5. (2 points) Use the graph to solve the following inequality: **circle the parts of the graph corresponding to the solution set of the inequality**, and write down the solution set in interval notation.

$$\frac{6x-18}{2x-3} \geq 0$$