Name_____Date_____Period_____

Day #37 Homework

For problems 1 – 6, determine the equation of the horizontal asymptote of the function and give a reason. If the function does not have a horizontal asymptote, explain why it does not.

1. $f(x) = \dfrac{3x^2 + 10x + 8}{x^2 - 2x - 8}$	2. $h(x) = \dfrac{2x - 6}{x^2 - x - 2}$	3. $p(x) = \dfrac{2x - 3x^2}{2x^2 - x - 3}$
4. $h(x) = \dfrac{-2x^2 - 5x - 2}{2x^2 - 7x + 3}$	5. $f(x) = \dfrac{2x^2 + 8}{-2x - 8}$	6. $P(x) = \dfrac{(3 - 2x)(x + 3)}{(2 + x)(3 - x)}$

For problems 7 and 8, find the equation of the slant asymptote of the function. If the function does not have a slant asymptote, explain why it does not.

7. $f(x) = \dfrac{x^2 + 5x + 8}{x + 3}$	8. $f(x) = \dfrac{x^2 - x + 1}{2x - 2}$

Answer questions 9 – 11 using the graph of the rational function pictured to the right. The graph of the function has a removable point discontinuity at $\left(3, \frac{5}{3}\right)$ and an x – intercept at $\left(-\frac{1}{3}, 0\right)$.

9. What can be said about the degree of the numerator of the equation of $f(x)$ compared to the degree of the denominator? Give a reason for your answer.
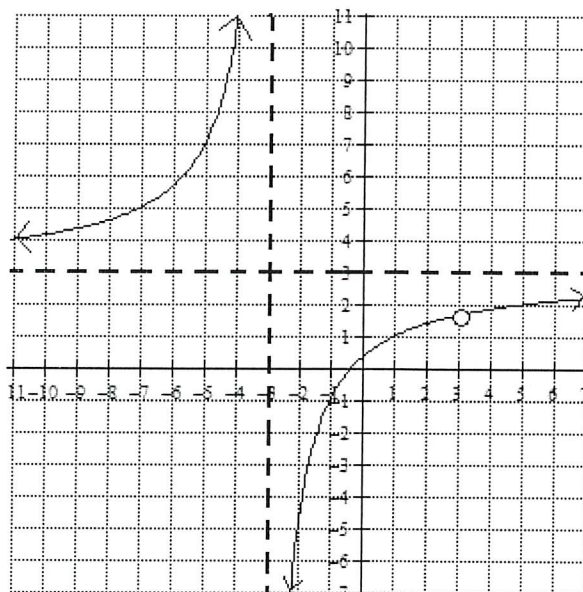
10. In factored and standard form, what is the equation of $f(x)$?

11. Give two reasons why the standard form equation you wrote in exercise 10 makes sense in the context of the graph.

12. The graph of the function $h(x) = \dfrac{x^2 - 7x + 2}{-2x + 6}$ is pictured to the right. Find the equation(s) of the asymptotes of the graph of $h(x)$ and draw them on the graph.
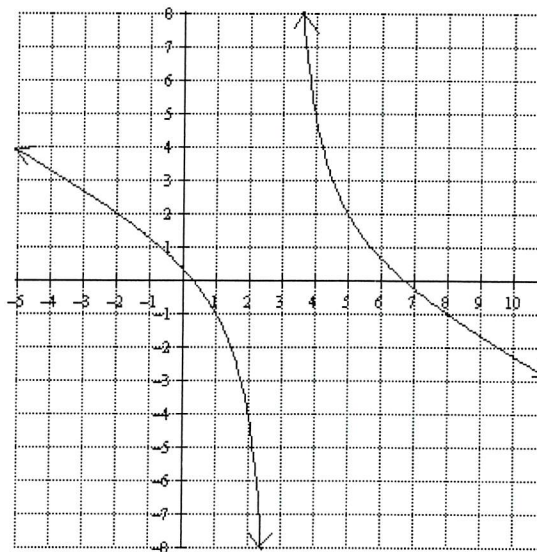
13. The graph of the function $g(x) = \dfrac{x^2 - x + 3}{x - 1}$ is pictured to the right. Find the equation(s) of the asymptotes of the graph of $h(x)$ and draw them on the graph.
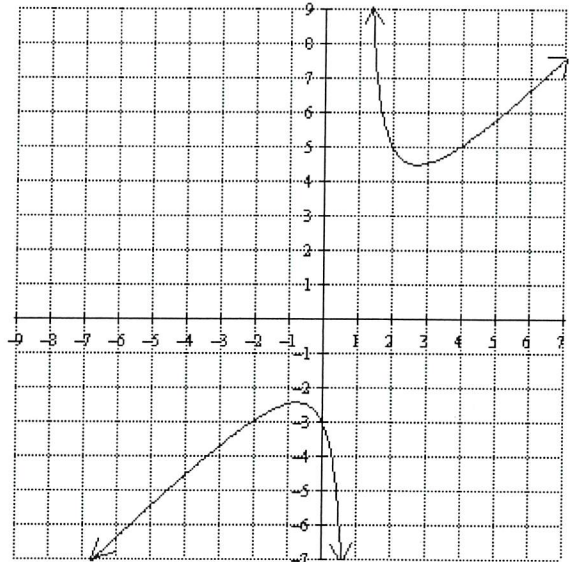
14. The graph of the function $h(x) = \dfrac{x^2 + 3x - 2}{3x + 6}$ is pictured to the right. Find the equation(s) of the asymptotes of the graph of $h(x)$ and draw them on the graph.