

**Pre-Calculus Honors
Review - Unit 7B**

Name: _____

1.

$f(x) = \frac{-5}{x-3} + 1$		End Behavior:
Put in lowest form		
Domain		
Holes		
Vertical asymptotes		
x intercepts		
y intercepts		
Non-vertical asymptote		
Does it cross NVA? Where?		
Function behavior		

2.

$f(x) = \frac{-5x^2 - 5x + 30}{x^3 + x^2 - 6x}$		End Behavior:
Put in lowest form		
Domain		
Holes		
Vertical asymptotes		
x intercepts		
y intercepts		
Non-vertical asymptote		
Does it cross NVA? Where?		
Function behavior		

3.

$f(x) = \frac{x^3 - 9x}{3x^2 - 6x - 9}$		End Behavior:
Put in lowest form		
Domain		
Holes		
Vertical asymptotes		
x intercepts		
y intercepts		
Non-vertical asymptote		
Does it cross NVA? Where?		
Function behavior		

4.

$f(x) = \frac{x^3 - 16x}{-4x^2 + 4x + 24}$		End Behavior:
Put in lowest form		
Domain		
Holes		
Vertical asymptotes		
x intercepts		
y intercepts		
Non-vertical asymptote		
Does it cross NVA? Where?		
Function behavior		

For Questions 5-10, write True or False. If false, give an example to support your argument.

5. _____ If the graph of a rational function f has a horizontal asymptote at $x = 3$, it is possible to sketch the graph without lifting your pencil from the paper.
6. _____ The graph of a rational function never crosses its vertical asymptote.
7. _____ Every rational function has a vertical asymptote.
8. _____ The graph of $g(x) = \frac{x^3}{(x-1)^2} - 5$ has both a slant and a horizontal asymptote.
9. _____ If the graph of a rational function has a hole at $(1, 2)$, then both the numerator and denominator must have $(x + 1)$ as their common factor.
10. _____ If a rational function has an x-intercept at $x=5$ then the denominator contains the factor $(x-5)$.

Solve each inequality algebraically. Show the function behavior on a number line. Write the solution using interval notation.

11. $(x - 3)(2x + 3)(x + 8) \leq 0$



12. $\frac{-5}{x+6} \leq \frac{9}{x}$



13. $\frac{8}{x-3} \geq \frac{2}{x+4}$



14. Write (in factored form) the equation of a rational function that has a vertical asymptote $x=-3$ and $x=5$, an x-intercept $(-2,0)$ and $(1,0)$, a slant asymptote exists, and a point discontinuity (“hole”) when x is 7.

$f(x) =$ _____

15. Factor the polynomial $f(x) = 5x^3 + 15x^2 - 5x - 15$ by doing the following:

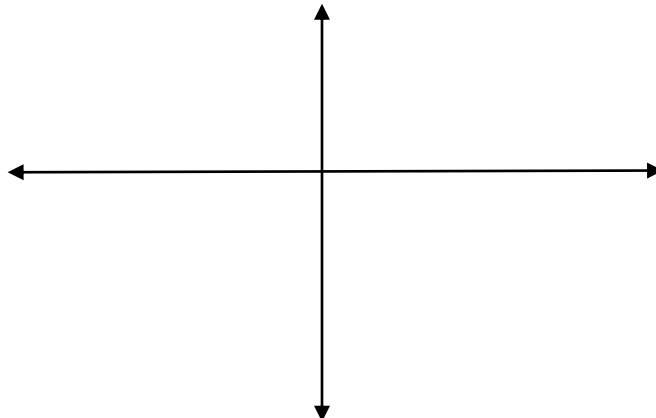
a. Find all **possible** real factors of $f(x)$. (p/q)



b. Use Descartes rule of signs to determine the types of roots you may use.

c. Write the polynomial in factored form. Use the list above to find one zero that works then finish the problem. (Use synthetic division and show work!)

c. Draw a rough sketch of the polynomial.
Label x-intercepts, y-intercept, and end behavior.



16. Find a polynomial in factored form of degree 3 with real coefficients if it has zeros of 4, -1, and 3 and $f(1) = 36$.

17. Give a polynomial in standard form with zeros $x=2$, $-3i$ and $f(3) = -13$.

18. Find all zeros for: $f(x) = 2x^4 + x^2 - 3$

zeros _____