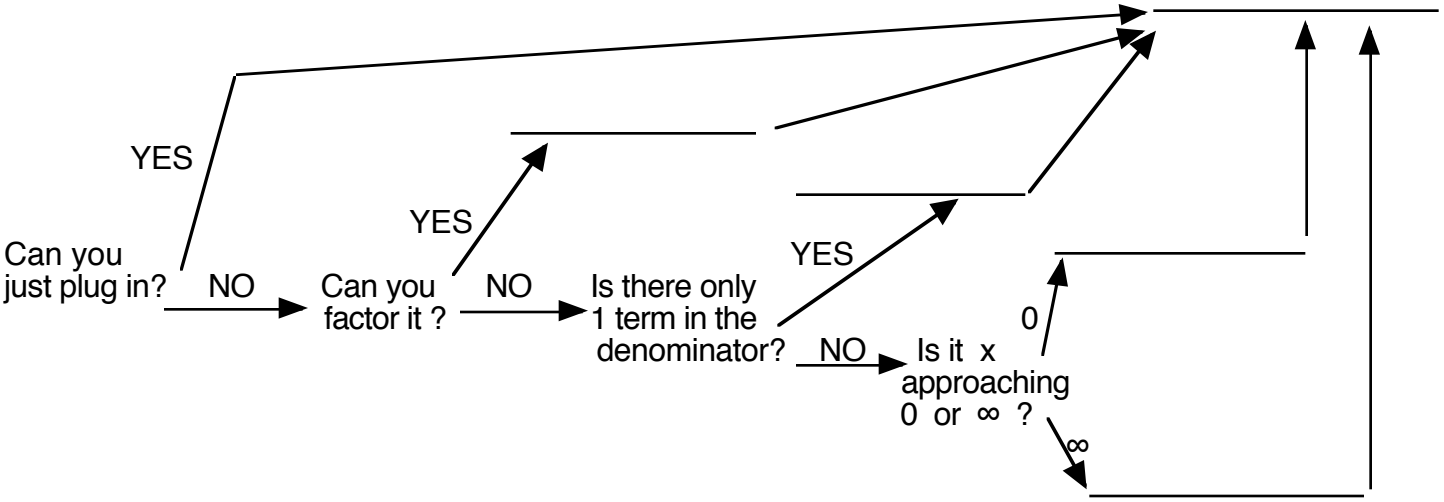
Name: _____ **AP**

Classwork 11

1. Find $\lim_{x \to 0} \frac{\sin x}{x}$

2. Find $\lim_{x \to 9} \frac{x^2 - 81}{\sqrt{x} - 3}$

Decision-making tree for polynomial function limits:



3. Write the complex conjugate of each complex number.

a) $4 + 2i$ b) $3 - 7i$ c) $1 + .5i$

4. What could you multiply the following expression by in order to remove **all** square root signs?

$4 - \sqrt{5}$

5. Find $\lim_{x \to 0} \dfrac{\sqrt{x^2 + 9} - 3}{x^2}$

6. Find $\lim_{x \to 10} \dfrac{\sqrt{x - 1} - 3}{x - 10}$

7. Find $\lim_{x \to 1} \dfrac{1 - x}{\sqrt{5 - x} - 2}$

8. Find $\lim_{x \to 0} \dfrac{\sqrt{\sin x + 1} - (1 + x)}{x}$

Practice Problems

1. Write the conjugate of $\sqrt{x^2 - 5x + 1} - 8x^3$

$\sqrt{x^2 - 5x + 1} + 8x^3$

2. Find $\lim_{x \to 6} \dfrac{5 - \sqrt{x^2 - 11}}{x - 6}$

Multiply top & bottom by $5 + \sqrt{x^2 - 11}$; top simplifies to $25 - (x^2 - 11) = 36 - x^2 = (6 - x)(6 + x)$. So, we can cancel $6 - x$ with $x - 6$ and get -1, giving $-12/10 = -1.2$

3. Find $\lim_{x \to 3} \dfrac{\sqrt{x^2 - 5} - \sqrt{x + 1}}{x - 3}$

Multiply top & bottom by $\sqrt{x^2 - 5} + \sqrt{x + 1}$. Top simplifies to $(x^2 - 5) - (x + 1) = x^2 - x - 6 = (x - 3)(x + 2)$. So we get the $x - 3$ to cancel and we are left with "1 / ugly". Plug in and get $1/(2 + 2) = 1/4$