Name ____________________ Date ____________ ICM Notes

Finding Limits Algebraically

- If a function is continuous at c, you can evaluate the limit using direct substitution. (You can substitute c into the function to evaluate the limit as long as it doesn't result in a denominator of 0.)

Examples

1) $\lim_{x \to 2}(4x^2 + 3)$

2) $\lim_{x \to -3}\left(\frac{x^2-1}{x-1}\right)$

- If two functions f(x) and g(x) are equal for all x ≠ c and $\lim_{x \to c} g(x)$ exists, then $\lim_{x \to c} f(x) = \lim_{x \to c} g(x)$. (If you can simplify a rational function so that f(c) is no longer undefined, then simplify and substitute c for x to find the limit.)

Examples:

3. $\lim_{x \to 2}\left(\frac{x^2-4}{x-2}\right)$

4. $\lim_{x \to 3}\left(\frac{x^3-27}{x-3}\right)$

You try!! Find each limit.

Checked using table. :)

5. $\lim_{x \to -3}(2x^2 - 5x) = 2(-3)^2 - 5(-3) = \boxed{33}$ ✓

6. $\lim_{x \to 1}\sqrt{5x+4} = \sqrt{5(1)+4} = \sqrt{9} = \boxed{3}$ ✓

7. $\lim_{x \to -3}\left(\frac{x^2-x-12}{x^2-9}\right) = \lim_{x \to -3} \frac{(x-4)\cancel{(x+3)}}{(x-3)\cancel{(x+3)}} = \lim_{x \to -3} \frac{x-4}{x-3} = \frac{-3-4}{-3-3} = \frac{-7}{-6} = \boxed{\frac{7}{6}}$ ✓

8. $\lim_{x \to 2}\left(\frac{x^3-8}{x^2-4}\right) = \lim_{x \to 2} \frac{\cancel{(x-2)}(x^2+2x+4)}{\cancel{(x-2)}(x+2)} = \frac{2^2+2(2)+4}{2+2} = \frac{12}{4} = \boxed{3}$ ✓