Math 150 - Week-In-Review 3

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Section 3.1 – Simplifying Rational Expressions

1. **Simplify each expression and determine for what values of x, if any, the simplified expression is not equivalent to the original expression.**

   (a) $\dfrac{x^2+4x-12}{3x-6}$

   (b) $\dfrac{\dfrac{2}{x}-3}{1-\dfrac{1}{x-1}}$

   (c) $\dfrac{x^2+4x-5}{3x+18}\cdot\dfrac{2x-1}{x+5}$

(d) $\dfrac{2x^2+x-6}{x^2-1} \div \dfrac{x^2-4}{x^2+2x+1}$

(e) $\dfrac{6}{x^2+4x+4} + \dfrac{2}{x^2-4}$

(f) $\dfrac{x}{x^2+5x+6} - \dfrac{3}{x^2+7x+12}$

(g) $x\left(1-2x\right)^{-3}+\left(1-2x\right)^{-2}$

(h) $\dfrac{\left(4-x^2\right)^{1/2}+x^2\left(4-x^2\right)^{-1/2}}{4-x^2}$

2. **Find and simplify the difference quotient** $\dfrac{f(x+h)-f(x)}{h}$, $h \neq 0$**, for each function** f **given.**

   (a) $f(x) = x^2 - 12x + 5$

   (b) $f(x) = \sqrt{x+3}$

   (c) $f(x) = \dfrac{1}{2x-1}$

3. **The height, s, in feet, of a football kicked off at the start of an A&M game, after t seconds, is given by the function $s(t) = -16t^2 + 80t$. Estimate the instantaneous velocity of the football one second after the kickoff by first finding the average velocity of the football over the interval $[1, t]$.**