Math 261 - Lab 2 **More Algebra Review** **Name:** ______________________________

1. Let $f(x) = \sqrt{x-1}$. Find and simplify the following.

   (a) $f(19)$

   (b) $\dfrac{f(a+h)-f(a)}{h}$, $h \neq 0$
   Hint: Rationalize the numerator.

   (c) $f\left(\dfrac{9}{5}\right)$

2. Find the domains of the following functions. Express each domain in interval notation.

   (a) $g(x) = (3x^2 - 2x)\sqrt{6-7x}$

   (b) $s(t) = \dfrac{3t-2}{2t^2 - t - 6}$

3. Solve the following inequalities. Express each solution in interval notation.

   (a) $|3 - 2x| \leq 5$

   (b) $3(2x-5) - (x+6) \geq -3(x-2)$

   (c) $x^3 + 5x^2 > 6x$

   (d) $-4x(1-3x) - 12x^2 \geq 3$

(e) $\dfrac{x+1}{x^2-5x+6} \geq 0$

(f) $\dfrac{2x}{2x-3} \leq \dfrac{x+2}{x+5}$

4. Given the function defined by $f(x) = \dfrac{\frac{2}{3}(x-1)^{-\frac{1}{3}}(x+2)^2 - 2(x-1)^{\frac{2}{3}}(x+2)}{[(x+2)^2]^2}$. [Hint: Have you seen this expression before?]

(a) Evaluate $f(-7)$.

(b) Determine the domain of f.

(c) Solve $f(x) = 0$.

(d) Solve $f(x) > 0$.

5. Solve the following equations.

(a) $\frac{1}{x} - \frac{2}{x+1} = \frac{5}{x^2+x} - 2$

(b) $\sqrt{5-x} + 1 = x - 2$