Extra Practice: Function Notation and Sign Charts

1. Let $f(x) = \sqrt{x}$. Find an expression for $f(ax+b)$. Find an expression for $f(x+h)-f(x)$.
2. Let $f(x) = \frac{2}{x}$. Find and simplify the expression for $\dfrac{f(x+h)-f(x)}{h}$
3. Let $f(x) = x^2 - 3x$. Find and simplify the expression for $f(3x-4)$. Find and simplify the expression for $f(x+h)-f(x)$.
4. Let $f(x) = 4$. Find and simplify the expression for $\dfrac{f(x+h)-f(x)}{h}$
5. Let $f(x) = 2^x$, $x = 1$ and $h = 2$. Find and simplify the expression for $\dfrac{f(x+h)-f(x)}{h}$.
6. Find the domain: $f(x) = \sqrt{\dfrac{3x-x^2}{x+2}}$
7. Find the domain: $f(x) = \ln\left(x(x+2)(x-3)\right)$
8. Solve for x, if $x^3 - x \geq 0$
9. The following are False; explain why. If possible, change the statement so that it is true.
   (a) Let $a, b > 0$. Then $\sqrt{a^2+b^2} = a+b$
   (b) $\ln(x(x-1)/x+2) = \ln(x) + \ln(x-1) - \ln(x+2)$ for all x.
   (c) Let $f(x) = x^{-1}$. Then
   $$\frac{f(x+h)-f(x)}{h} = \frac{x^{-1}+h-x^{-1}}{h} = 1$$
   (d) $\ln(a+b) = \ln(a) + \ln(b)$ if $a, b > 0$.
   (e) $(a+b)^2 = a^2 + b^2$
10. Misc. Algebra problems:
    (a) Solve for y: $x = \dfrac{6y-5}{y+1}$
    (b) Solve for x in terms of y, z: $\dfrac{6}{x} = \dfrac{11}{y} + \dfrac{15}{z}$
    (c) Simplify and write without negative exponents: $\dfrac{4x^{-9}y^{-5}}{9x^{-3}y^{-9}}$
    (d) Simplify: $\left(x^{4/7}y^{-4/9}\right)^{9/4}$
    (e) Simplify: $\dfrac{\frac{3s^2-48}{s^2+2s-8}}{\frac{7s-28}{s^2-4s+4}}$