Tutorial 1

Week of September 10, 2018

1. Simplify the following.

   (a) $\dfrac{(3+h)^2 - 9}{h}$

   (b) $\dfrac{(m(x+h)+b) - (mx+b)}{h}$

   (c) $\dfrac{3\sqrt{2} + 2\sqrt{3}}{\sqrt{12} - \sqrt{8}}$

2. Are the following always true? If not, provide a counterexample.

   (a) $\dfrac{x^2}{x+a} = \dfrac{x}{1+a}$

   (b) $\dfrac{y}{x+y} = 1 - \dfrac{x}{x+y}$

3. State the domain for each function.

   (a) $f(x) = \sqrt{x^2 - 4x}$

   (b) $g(x) = \dfrac{x^2 + 4}{x^2 - 9}$

   (c) $k(u) = \dfrac{u+1}{1 + \frac{1}{u+1}}$

4. Complete the square to find the vertex. State the interval of increase and decrease.
   $y = 2x^2 + 10x + 6$

5. Sketch the following function:
   $y = ||x - 3| - 2|$