Math 10a  Self-Quiz on Precalculus Review (Part I)

• Don’t use a calculator for this selfquiz.
• Make sure that you also look at the the second precalculus selfquiz on LATTE.

1. Write the following set using interval notation: \( \{ x : x \leq -3 \} \).

2. Find all real solutions to the following:
   
   (a) \( x^2 + x = 3 \)  
   (b) \( \frac{x^2 + 3x - 10}{x^2 - 4} = 0 \)  
   (c) \( \frac{5}{x^2 - 10x + 21} = 0 \)

3. Find the domain of \( f(x) = \frac{3x + 1}{x^3 - 2x} \). Write your answer in interval notation.

4. Find the \( x \)- and \( y \)-intercepts (if they exist) of the function \( f(x) = \frac{x^2 + 5}{x^2 - 4} \).

5. Suppose that \( f(x) = \frac{1}{x + 2} \). Find \( \frac{f(x + h) - f(x)}{h} \) and simplify as much as possible.

6. Graph the function \( f(x) = \begin{cases} 
  x + 3, & \text{if } x \leq -1 \\
  |x|, & \text{if } -1 < x \leq 1 \\
  \frac{1}{x}, & \text{if } x > 1 
\end{cases} \).

7. Find the following (angle measurements are in radians, unless the degree symbol ° is used). No calculators!
   
   (a) \( \sin 150° \)  
   (b) \( \tan \frac{5\pi}{4} \)  
   (c) \( \cos \left(-\frac{\pi}{3}\right) \)  
   (d) \( \sec 450° \)  
   (e) \( \cot \left(-\frac{7\pi}{6}\right) \)  
   (f) \( \csc \frac{4\pi}{3} \)

8. Graph the function \( f(x) = 2 \sin(x - \frac{\pi}{2}) \).

9. Let \( h(x) = \sqrt{\tan x + 5x} \). Find two functions \( f(x) \) and \( g(x) \) such that \( f(g(x)) = h(x) \).

10. Find the values of \( \theta \) in the interval \([0, 2\pi]\) which make the following equation true:
    
    \[ 2 \cos \theta + 1 = 0. \]