Math 101-Exam II

1. Find the equation of a function which resembles $y = \dfrac{1}{x}$ shifted 8 units left and 6 units down. Express the domain and range of this function in the interval notation.

   Domain_____ Range_____

2. Give that $f(x) = x^2 + x$, find and simplify the difference quotient $\dfrac{f(x+h) - f(x)}{h}$.

3. Write each of the following in the form $a + bi$:

   (a) $\dfrac{1 - i^2}{3 - i}$

   (b) $(5 + 2i)(4 - 3i) + 1^{10}$

4. Find the dimensions of a rectangular picture frame if the perimeter of the frame is 14 inches and the area of the frame is 12 square inches. You must write and solve equations for full credit!

5. Sketch a graph of the function

$$f(x) = \begin{cases} x^2 + 2, & x < 0, \\ 3x + 2, & 0 \leq x < 4 \end{cases}.$$

   Label at least 3 points.

6. In triangle ABC, angle B is 3 times as large as angle A, and angle C is 5 degrees more than angle B. Write and solve equations to find the measures of angles A,B, and C.

7. Solve $A = P + Prt$ for P.

8. Find <u>all</u> solutions to the following equations:

   (a) $3(2x+1)+2(1-2x)=4x$

   (b) $x^3-5x^2-6x=0$

9. Let $f(x)=3x+12$ and $g(x)=\sqrt{2x+4}$. Find and simplify the following:

   (a) the domain of $g(x)$ in interval notation

   (b) $(f-g)(6)$

   (c) $(f\circ f)(x)$

   (d) $(g\circ g)(x)$