REVIEW PROBLEMS, EXAM 1
PRECALCULUS, MATH 1375

1. Solve for x: $|x - 1| = 8,$ $|2x - 3| = 9,$ $1 + |4 - x| = -11.$

2. Consider the line with the following equation:
$$(i)\ 3x - 5y = 10, \qquad (ii)\ x + y = 3.$$
   Write the equation of the line in slope-intercept form. Find the slope, the y-intercept, and draw the line.

3. Find the domains of the following functions:
$$f(x) = x^3 + 7x^2 + 4, \qquad f(x) = \sqrt{x - 1}, \qquad f(x) = \frac{x}{x - 5}.$$

4. Solve for x and write the solution in interval notation:
$$|2x + 7| \le 13, \qquad |15 - 3x| \ge 6, \qquad |x - 7| < -1.$$

5. Find the difference quotient $\frac{f(x+h) - f(x)}{h}$ for
$$f(x) = x^2 + 2, \quad f(x) = 2x + 5.$$

6. Find the composition functions $f \circ g$ and $g \circ f$ for the functions
$$(a)f(x) = \frac{1}{x + 1}, \ \ g(x) = x^2 + 3, \qquad (b)f(x) = \sqrt{x}, \ \ g(x) = x - 1.$$

7. Find the inverse of the function f and check your solution.
$$f(x) = 2x + 1, \qquad f(x) = x^3 - 1, \qquad f(x) = \frac{2}{x + 7}.$$

8. Find a polynomial f that fits the give data.
   (a) f has degree 3; f has real coefficients, 1, i are roots, and $f(0) = 4$.
   (b) f has degree 4; f has real coefficients, and 0, 2, 3+i are roots of f.

9. Find the roots for the following polynomials and use this information to factor the polynomials completely:
   (a) $f(x) = 2x^3 - 8x^2 - 6x + 36$
   (b) $f(x) = x^4 - 16$
   (c) $f(x) = x^3 + 1.$