**MAT 1308 A** Assignment 1 (Due TUE. Jan. 25th, 17:30) **Student Number**:

NAME:

**Problem 1:** What is TRUE and what is FALSE? Circle the true statements!

(a) $-\frac{1}{5} = \frac{-1}{5} = -(\frac{1}{5}) = \frac{1}{-5}$

(b) $(\frac{-1}{3})^2 = 3^2$

(c) $\frac{4^2}{4} = 2$

(d) $\frac{1\times 3}{2\times 3} = \frac{1}{2}$

(e) $[-1,\infty) = \{x \in \mathbf{R} | -1 < x\}$

(f) $\pi \in \mathbf{Q}$

(g) $1 = \sqrt[3]{-1}$

(h) $\frac{\frac{2}{3}}{5} = \frac{2}{3} \times \frac{5}{7}$

(i) $\frac{1}{2} \times \frac{3}{5} = \frac{1\times 5}{2\times 3}$

(j) $\sqrt[2]{(-2)^2} = 2$

(k) $\sqrt[3]{(-2)^3} = 2$

(l) $2^{\frac{1}{2}} = \sqrt{2}$

**Problem 2:** Fill in the following computations:

(a) $\frac{1}{5} - \frac{3}{2} = \frac{1\times\ldots}{5\times\ldots} - \frac{3\times\ldots}{2\times\ldots} = \frac{1\times\ldots-3\times\ldots}{5\times\ldots} = \frac{\ldots}{\ldots}$

(b) $1 + \frac{1}{\ldots} = \frac{\ldots}{4} + \frac{1}{4} = \frac{4+1}{\ldots} = \frac{\ldots}{\ldots}$

(c) $2 - \frac{1}{3} = \frac{2\times\ldots}{3} - \frac{1}{3} = \frac{6-\ldots}{\ldots} = \frac{\ldots}{\ldots}$

(d) $4^{-2} = \frac{\ldots}{\ldots}$

**Problem 3:** Fill in by using one of the symbols: $\bigcap, \bigcup, \subset, \in, \notin, \supset, \not\subset$.

$(-\infty, 0) \ldots [1, +\infty) = \emptyset$.

$2011 \ldots \mathbf{N}$.

$\frac{1}{2} \ldots \{1, 2, 3, 4, 5\}$.

$\{-1, \frac{-1}{5}, 0, 3, \sqrt{2}\} \ldots \mathbf{Q} = \{-1, \frac{-1}{5}, 0, 3\}$.

$(-3, 1) \ldots (0, 5) = (0, 1)$.

$\{2\} \ldots \mathbf{N}$.

$0.15 \ldots \mathbf{Q}$.

$\{0.15\} \ldots \mathbf{N}$.

**Problem 4:** Compute:

(a) $\frac{1}{1+\frac{1}{1+3}} =$

(b) $\frac{1}{x+2} + \frac{2}{x-1} =$

**Problem 5:** Rationalize:

$\frac{\sqrt{2}+\sqrt{3}}{\sqrt{2}-\sqrt{3}} =$

**Problem 6:** Simplify:

$i)(2a^{\frac{1}{2}}b^2)^2$ $\qquad$ $ii)\ \sqrt[2]{16y^2}$

**Problem 7:** SOLVE:

(a) $1 + |1 - 2x| > 2$.

(b) $\frac{1}{x+3} \leq \frac{1}{x-2}$.

(c) $\frac{2}{x} = \frac{1}{x} + 2$.

(d) $\frac{(x-2)(3-x)}{2x-1} < 0$.

(e) $x^2 - 3x - 6 > 0$.

(f) $2x - x^2 = 2 + 2x^2$.

More space for Problem 7.

**Problem 8:** (I) Find the domain for each of the following functions:

(a) $f(x) = x^2 - 1$.

(b) $g(x) = \frac{1}{|x+1|}$

(c) $h(x) = \frac{x}{\sqrt{x^2-1}}$

(d) $k(y) = \frac{|y-1|}{|y|-1}$

(e) $s(x) = \sqrt{x^2 - 2x + 1}$

(f) $p(x) = \frac{x-1}{x-1}$

(II) Find $f \circ g(0)$ et $f \circ k(0)$.

(III) Find the equation of the line that cuts (intersects) the graph of $f(x)$ at $x = 1$ and $x = 2$.

More space for Problem 8.

**Problem 9:** Let $y = f(x)$ be a function. We shift up the graph of $f(x)$ 2 units, and then we shift (horizontally) 3 units to the left. The resulting graph belongs to the function $g(x) = f(x+a)+b$. FIND $a$ and $b$.

ANSWERS: $a =$ and $b =$

**Problem 10:** Find $c$ such that the equation

$$4x^2 - 12x + c = 0$$

has a unique solution.

**Problem 11:** Below you will find the graph of a function $f(x)$.

(a) Use this graph to compute: $f(0), f(3)$ and $f(-1)$.

(b) Is $f$ an even function? Justify your answer.

(c) Graph on the same graph the following functions (you may use other colors): $g(x) = 2f(x)$, $h(x) = f(x) + 4$, $s(x) = f(x - 1)$ and $k(x) = -f(x)$.