MATH 118: Midterm 1

Name: _____

Directions:

* Show your thought process (commonly said as "show your work") when solving each problem for full credit.
* If you do not know how to solve a problem, try your best and/or explain in English what you would do.
* Good luck!

Problem	Score	Points
1		10
2		10
3		10
4		10
5		10
6		10
		60

1. Short answer questions:

   (a) Suppose you write
   $$(x+y)^2z^2 = x^2 + y^2z^2$$
   What are the two errors you made?

   (b) True or false: We can simplify $\dfrac{x^2 + x - 2}{x - 1}$ by crossing out the x's to become $\dfrac{x^2 - 2}{-1}$. If not, properly simplify the expression.
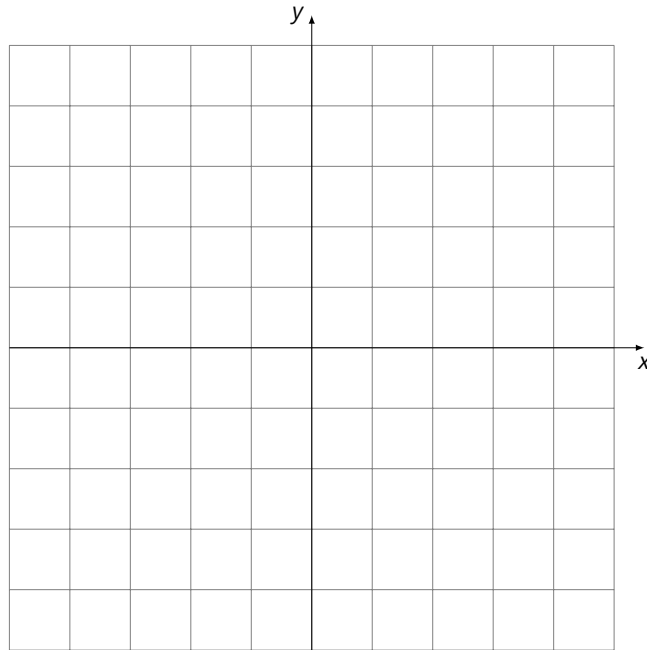
   (c) If $f(x) = \dfrac{x}{1 - x}$, find $f(x^2 - 1)$.

   (d) If $i^2 = -1$, what is i^{531}?

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2. Suppose

$$f(x) = \begin{cases} 3 & x > 1 \\ x^2 & x \le 1 \end{cases}$$

(a) Sketch a graph of $f(x)$.

(b) What is $f(1)$?

3. Fully simplify the following using relevant properties and laws.

(a) $\left(\dfrac{4x^2y}{5z^{-1}}\right)^2 \cdot \dfrac{1}{x^2z^2}$

(b) $\left(\dfrac{1}{x^2-1} - \dfrac{2}{x-1}\right)^2$

4. Given $ax - bx(c + d) - ex = gx$, isolate x.

5. Solve for x. Check your work if necessary.

$$x + 1 = \sqrt{5 - x}$$

6. Fully factor and simplify

$$(x^3 + x^2 + x + 1)^2 - 2(x^3 + x^2 + x + 1) + 1$$