I haven’t quite decided on the grading method yet, so check back soon. It’ll be here.

1. (3 pts) Simplify the following and write without negative exponents:

\[
\left( \frac{81x^{-7}}{x^5} \right)^{\frac{1}{2}} = \left( \frac{81}{x^{12}} \right)^{\frac{1}{2}} = \frac{3}{x^3}
\]

(1)

2. (3 pts) Simplify the following expression:

\[
5\sqrt{3x^3} - 4x\sqrt{12x} - \sqrt{27x^5}
\]

\[
5\sqrt{3x^3} - 4x\sqrt{12x} - \sqrt{27x^5} = 5x\sqrt{3x} - 8x\sqrt{3x} - 3x^2\sqrt{3x} = (5x - 8x - 3x^2)\sqrt{3x} = -(3x^2 + 3x)\sqrt{3x}
\]

(2)
(1 pts) Write the following as a piecewise expression:

\[ |x^2 - 1| \]

Note: I had intended to make this question more challenging than the other two, but I realized too late that the answer that I wanted to receive didn’t mesh with how the textbook said to deal with square roots. Since this was a mistake on my part, anyone who made a full attempt at solving the problem with no obvious errors will receive full points. Below is what I had intended to be the solution.

\[
\begin{align*}
|x^2 - 1| \\
x^2 - 1 &= 0 \\
x &= 1 \text{ or } x = -1 \\
x^2 - 1 &\text{ if } x \geq 1 \text{ or } x \leq -1 \\
-(x^2 - 1) &= -x^2 + 1 \text{ if } -1 < x < 1.
\end{align*}
\]

If you got this, congratulations. If you instead took \(x\) to be positive and got
\[
\begin{align*}
x^2 - 1 &\text{ if } x \geq 1 \\
-x^2 + 1 &\text{ if } x < 1
\end{align*}
\]
That’s fine too. As a note for future reference in dealing with absolute values, it’s often helpful to draw a graph of the equation and make a note of where approximately it is negative and positive.

University of Florida Honor Code:

On my honor, I have neither given nor received unauthorized aid in doing this assignment.

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Signature