Directions: Please answer the following questions and make sure your answers are legible. You must show your work to receive credit for your answers. You may not use a calculator (or any other technology) on this quiz. Good Luck.

1. (4 points) Evaluate each expression. Simplify your answers.
   
   \[
   \begin{align*}
   (a) \quad \frac{2}{15} + \frac{8}{9} & = \frac{2\cdot3}{45} + \frac{8\cdot5}{45} = \frac{14}{45} \\
   (b) \quad \frac{6}{11} & = \frac{5 \cdot 13}{11} = \frac{5 \cdot 3 \cdot 9}{9 \cdot 2 \cdot 11} = \frac{15}{33}
   \end{align*}
   \]

2. (2 points) Find the value of the expression \(3|x| + 2|y|\) if \(x = 3\) and \(y = -2\). Simplify your answers. (R2 #56)
   
   \[
   = 3|3| + 2|-2| = 9 + 4 = 13
   \]

3. (2 points) Simplify each expression \(4^{-2} \cdot 4^{3}\). (R2 #78)
   
   \[
   4^{-2} \cdot 4^{3} = 4^{-2+3} = 4 = 4
   \]
   
   or
   
   \[
   4^{-2} \cdot 4^{3} = \frac{4^{3}}{4^{-2}} = 4^{3-(-2)} = 4^{5}
   \]

4. (3 points) Simplify the expression \(\frac{(-2)^{3} \cdot x^{4} \cdot (yz)^{2}}{3^{3} \cdot xy^{2}z}\). Express your answer so all exponents are positive. Whenever an exponent is 0 or negative, we assume the base is not 0. (R2 #91)
   
   \[
   = \frac{-8 \cdot x^{3} \cdot z}{9 \cdot y^{3} \cdot z} = \frac{-8x^{3}z}{9y}
   \]
5. (3 points) Find the area of the shaded region: (R3 #39)

\[ d = \sqrt{x^2 + y^2} \quad \text{pyt. thm} \]

\[ d^2 = x^2 + y^2 \]
\[ d = \sqrt{8} = 2\sqrt{2} \]
\[ r = \frac{\sqrt{8}}{2} = \sqrt{\frac{4}{2}} = \sqrt{2} \]

\[ A_{\text{circ}} = \pi r^2 = \pi (\sqrt{2})^2 = 2\pi \]

6. (3 points) Find the product \((x+5)^2\) and express your answer as a single polynomial in standard form. (R4 #70)

\[ (x+5)^2 = (x+5)(x+5) = x^2 + 10x + 25 \]

7. (3 points) Find the quotient and remainder when \(5x^4 - 3x^2 + x + 1\) is divided by \(x^2 + 2\) (R4 #93)

\[ \begin{array}{c|cc}
5x^2 - 13 \\
\hline
5x^4 + 0x^3 - 3x^2 + x + 1 \\
- 5x^4 \\
\hline
-13x^2 + x + 1 \\
+ 13x^2 + 26 \\
\hline
x + 27 \\
\end{array} \]

\[ \begin{align*}
Q &= 5x^2 - 13 \\
R &= x + 27
\end{align*} \]