1. (8 points) Simplify, using only positive exponents (you can assume that $x, y \neq 0$):

$$\frac{(x^2y^{-3})^2}{(y^3x^{-1})^3}$$

2. (5 points) Write $\frac{\sqrt[3]{x^2}}{\sqrt{x}}$ as a rational power of $x$ (assume $x$ is positive).

3. (8 points) Simplify by extracting squares ($y$ could be negative in (a)):

(a) $\sqrt{y^{10}} =$

(b) $2\sqrt{75} - 3\sqrt{12} =$

4. (5 points) Expand $(2x - 3)(x^2 + 2x - 2)$ to give a polynomial in standard form.

5. (7 points) Simplify $\frac{x^2 - 2x}{x^2 + x - 6}$.
6. (12 points) Factor the following polynomials as far as possible:
(a) \( 3x^2 + x - 2 = \)

(b) \( 9x^2 - 4 = \)

(c) \( x(x - 3)^2 + 2x^2(x - 3) = \)

7. (7 points) Simplify \( \frac{2}{x + 2} - \frac{1}{x - 4}. \)

8. (8 points) Solve \( \frac{5}{x + 1} - \frac{2}{x} = \frac{3}{x(x + 1)} \) for \( x \).

9. (7 points) Use your calculator to graph
\[ y = 5 + 3x - x^3, \]
with the window settings shown.
Find the coordinates of the intercepts correct to three decimal places:
\[ x\text{-intercept}= \__ \__ \__ \__ \]
\[ y\text{-intercept}= \__ \__ \__ \]
10. (8 points) Perform the operation and simplify: \( \frac{2x}{x^2 - 9} - \frac{1}{x - 3} \).

11. (6 points) Solve the linear equation for \( x \). Give the exact value of \( x \) (a calculator-produced decimal will not earn full credit).
   \[ 3(2 + x) = \sqrt{2}(x + 5) + 7 \]

12. (8 points) A total of $1800 was invested in a mixture of stocks and bonds. The stocks earned 3\% while the bonds earned 5\%. If the total earned was $81, how much was invested in stocks?

13. (4 points) Find the distance between the points \((-3, 2)\) and \((2, -3)\).

14. (7 points) Rewrite the equation of the circle \( x^2 + y^2 + 6x = 7 \) in standard form and identify the center and radius.

   Center =
   Radius =