**COLLEGE ALGEBRA - MAT 140**

**FALL 2008 - EXAM 1**

**Name :**.....

TO RECEIVE FULL CREDIT YOU MUST SHOW YOUR WORK. No notes or books are allowed.

**No. 1. (7 points)** Simplify and write using positive exponents: $\left(\frac{3x^{-1}}{4y^{-1}}\right)^{-2}$

**No. 2. (6 points)** Subtract. $(x^3 - 2x^2 + 5x + 10) - (2x^2 - 4x + 3)$

**No. 3. (7 points)** Expand (multiply) $(2x + 3y)^2$

**No. 4. (10 points)** Factor completely $x^4 - 1$.

**No. 5. (10 points)** Find the least common denominator and simplify $\dfrac{3x}{x-1} - \dfrac{x-4}{x^2-2x+1}$.

**No. 6. (8 points)** Find the distance between the points $(4, -3)$ and $(6, 2)$.

**No. 7. (6 points)** Find the midpoint of the line segment joining the points $(3, -4)$ and $(5, 4)$

**No. 8. (10 points)** The area of a rectangular window is to be 306 square centimeters. If the length exceeds the width by 1 centimeter, what are the dimensions?

**No. 9. (10 points)** Use a graphing utility to approximate the real solutions, if any, of

$$x^3 - 4x + 2 = 0.$$

Round your answers to two decimal places. Sketch your graph in the given grid.

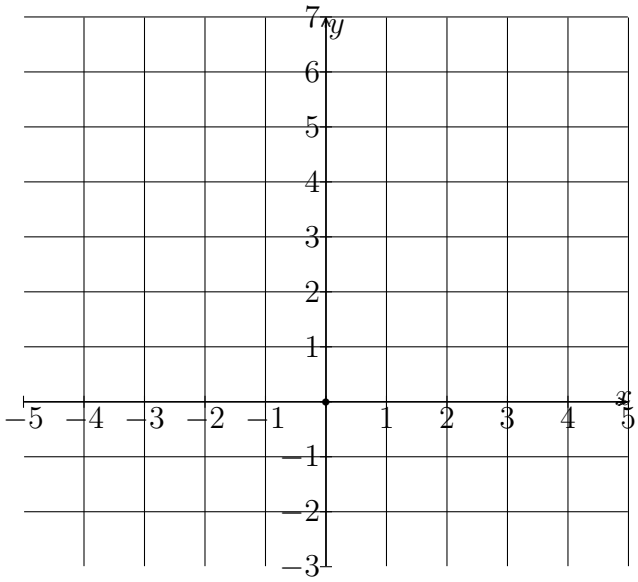


Figure 1: Sketch of $f(x) = x^3 - 4x + 2$

**No. 10. (10 points)** Find the real solutions of the equation: $x + \sqrt{x} = 6$

**No. 11. (8 points)** Find an equation for the line that contains the point $(0, 0)$ and is parallel to the line $2x - y = -2$.

**No. 12. (8 points)** Find an equation for the line that contains the point $(0, 4)$ and is perpendicular to the line $x - 2y = -5$.

**Bonus (5 points)** Find the center $(h, k)$ and the radius $r$ of the circle $x^2 + y^2 - 6x + 2y + 9 = 0$.