Make sure that you check the course website for instructions, fill out the pledge form and hand it in with your paper. The instructions for problem sets and take-home examinations along with the pledge form are available from the *General Policies* portion of the web site. *No paper will be accepted without a signed pledge form.* Remember that your paper may be handed in before the deadline but that no late papers will be accepted regardless of the reason. The course website also includes an explanation of how your average will be calculated if you fail to complete this assignment.

Note that, since most of the calculations involved can be done routinely using either a calculator or a symbolic manipulation program such as Maple or Mathematica, it will obviously be necessary to show, through your work, exactly how you came up with your solutions.

1. Multiply and simplify: $(5x^2 - 4x - 2)(3x - \sqrt{x} + 5)$.

2. Divide: $(x^3 - 7x^2 - 20x + 96) \div (x - 8)$.

3. Find an equation for the line through the point $(2, 5)$ which is perpendicular to the line $3x + 12y = 17$

4. Solve: $|x| > 15$.

5. Solve: $|x - 9| = 3$.

6. Solve: $|x - 9| \geq 3$.

7. Solve $x^2 + 4x + 1 = 0$ using the Quadratic Formula.

8. Solve $x^2 + 4x + 1 = 0$ by Completing the Square.

9. Factor $x^3 - 7x^2 - 20x + 96$ completely.

10. Solve: $x^3 + 96 = 7x^2 + 20x$.

11. Solve: $x^3 + 96 > 7x^2 + 20x$.

12. Solve: $x^4 + 8x^3 + 140 = 9x^2 + 92x$.

13. Solve: $x^4 + 8x^3 + 140 \leq 9x^2 + 92x$.

14. Solve: $\dfrac{x + 5}{x - 2} \leq 0$.

15. You are able to drive to Boston without hitting any traffic and average 63 miles per hour for the entire drive. Unfortunately, you hit heavy traffic on your return trip and only aveage 47 miles per hour. Assuming the distances in both directions are exactly the same, what is your average speed for the round trip?

16. A $5'' \times 7''$ photograph is placed in a frame which has a total area of 43.2225 square inches. If the border surrounding the photograph is the same size on all sides, what are the dimensions of the frame?