

General Instructions: Write your name on only the outside of your blue book. Write all your solutions, and do all your work inside your blue book. Put your test paper inside your blue book as you leave. Solve each of the following problems. Point values (out of 100 points) are indicated on the problems.

1. Solve the following inequalities. (*10 points each*)

(a)
$$0 \leq \frac{(x-1)(x+4)}{(x-4)}$$

(b)
$$36 \leq |12x - 6|$$

(c)
$$0 < x^2 + x - 1$$

2. For each of the following parabolas determine the vertex, axis of symmetry, y -intercept, x -intercepts (if any), and sketch the graph (*10 points each*).

(a)
$$y = 9x^2 + 180x - 45$$

(b)
$$y = x^2 + x + 1$$

(c)
$$y = 2000x - 500x^2$$

3. (*10 points*) 10,000 feet of fencing are to enclose a rectangular area that is bounded on one side by a straight road. What is the maximum area that can be enclosed?

4. Sketch the graph of each of the following: (*10 points each*)

(a)
$$x^2 + 6x + y^2 - 8y = 24$$

(b)
$$4x^2 + 4y^2 - 8y = 60$$

(c)
$$x^2 - 24x + y^2 - 10y = 0$$