NAME:

This homework is worth 20 points and it is due on Wednesday, October 29, at the beginning of class. **No late homework will be accepted.**

**Instructions:** Attach this question sheet to your work, making it the cover page. The answers should be on 8 1/2 × 11 sheets with the question number clearly indicated. The solutions should be in order of the question number. For credit, show all steps and label answers. Papers will be graded on clarity, neatness and organization as well as correctness.

1. Find the equation of the perpendicular bisector of the line segment joining the points (1, 3) and (3, 7). Draw the line segment and the perpendicular bisector (#53, p.65).

2. Find the equation of the line through (2, 3) and parallel to $3x - 2y = 5$ (#59, p.65).

3. Let $f(x) = x^2 + 3x - 2$. Compute the difference quotient $\frac{f(x + h) - f(x)}{h}$.

4. Find the domain of $f(x) = \sqrt{x^2 - 25}$. Use your graphing calculator to sketch the graph of $f(x)$.

5. Let $f(x) = x^2 + 1$ and let $g(x) = x^2 - 3x - 10$. Find $f + g$, $\frac{f}{g}$ and their domains.

6. Find center, vertices, foci and asymptotes of the hyperbola $\frac{(x + 2)^2}{16} - \frac{(y - 1)^2}{9} = 1$. Sketch the graph (including the asymptotes).

7. Identify the conic sections below and graph them. If it is a circle find its center and radius; if it is an ellipse find its center, vertices, and foci; if it is a hyperbola find its center, vertices, foci and asymptotes; if it is a parabola find its vertex, focus and directrix.
   a) $2x^2 + 2y^2 - 4x - 8y - 5 = 0$
   b) $3y^2 = x - 1 + 2y$ (#57, p.711).

8. Let $f(x) = -3x + 2$ and $g(x) = x^3$. Find the rules of $f \circ g$ and $g \circ f$ (#21, p.202).