Problem 1   (10 points)

(a) $3^{1/p}$

(b) Any solution such that $\frac{1}{\sigma_1^2} > \frac{1}{\sigma_2^2} + \frac{1}{\sigma_3^2}$

Problem 2   (10 points)

(a) The sketch should show an ellipse with axes parallel to the main axes, passing through the points $(\frac{5}{2}, 0)$, $(-\frac{1}{2}, 0)$, $(1, 1)$, and $(1, -1)$.

(b) $(\Phi(0) - \Phi(-\frac{2}{3}))(\Phi(\frac{1}{2}) - \Phi(-\frac{1}{2}))$

Problem 3   (10 points)

(a) The sketch should show the line $x_1 + x_2 = 3\sqrt{2}$.

(b) 8

Problem 4   (10 points)

(a) The sketch should show the square $\max(|x_1|, |x_2|) = 1.5$.

(b) $\eta = \frac{1}{2}e^{9/16}$