1. Consider the parallelepiped which has sides \((1, 3, -2), (3, 3, 6),\) and \((4, -2, -1)\). What is its volume? (Hint: the volume of the parallelepiped given by the vectors \(\vec{a}, \vec{b}, \text{ and } \vec{c}\) is equal to the absolute value of the determinant of the matrix whose rows are \(\vec{a}, \vec{b}, \text{ and } \vec{c}\).)

2. Show that this parallelepiped is actually a rectangular prism.

3. Using Problem 2, find the volume of the parallelepiped from basic geometry rules. Make sure it agrees with your answer above!
4. Consider the quadric given by the equation \( z = \sqrt{2x^2 + 2y^2} \). On one graph, sketch and label the level curves in the planes \( z = -4, -3, -2, -1, 0, 1, 2, 3, 4 \).

5. In a second graph, sketch and label the level curves of the quadric above in the planes \( x = 0, 1 \), and in a third graph sketch and label the level curves \( y = 0, 1 \). Be sure to label axes!

6. Sketch the 3-dimensional object given by \( z = \sqrt{2x^2 + 2y^2} \). What is the name of this object?

7. How would the equation of the quadric change to make this object into a double cone?

8. Suppose you had a cup in the shape of this quadric which you wanted to fill with water. What would the depth of the water be when the horizontal surface of the water has an area of 16 square units?