The Pythagorean Theorem says that for a right \( \triangle \), with legs \( a \) & \( b \) & hypotenuse \( c \),  
\[ c^2 = a^2 + b^2 \]

Use the following diagram (by computing the area of the \((a+b)^2\) square two ways) to prove the Pythagorean Thm. Hint: first show that the inside \( c^2 \) is a square, using the fact that the sum of angles in a triangle is 180°.

Consider the point \( P = (1, 2, 3) \).

(a) Draw the \( x-y-z \) axes as on page 2 of today's (12/15) notes, and then draw the coordinate box fn \( P \), as we did on page 2. (So \( P \) is the origin are opposite vertices.)

(b) Use inequalities to specify the region inside the box.

(c) Use inequality and the equality \( z = 1 \) to specify the "front" face of the box.

(d) Use equalities and inequalities to specify (separately) the three edges which contain the point \( (1, -2, 5) = P \).

(e) How far is it from \( P \) to the origin?

(f) """""""" to the \( xy \)-plane?

(g) """""""" to the \( x \)-axis?

Sketch pieces of the following surfaces or regions which satisfy the given equities or inequalities:

- \[ x^2 + y^2 + z^2 = 9 \]
- \[ x^2 + y^2 + z^2 = 9 \]
- \[ x^2 + y^2 = 4 \]
- \[ x^2 + y^2 \leq 4 \]

11.1: \[ 13, 14, 17, 22, 25, 28, 31 \] ← in 31 also sketch this helix (which lies on the cylinder \( x^2 + y^2 = 4 \))

11.2: \[ 2, 3, 4, 7, 15, 17, 27 \]

11.3: \[ 1, 4, 6, 8, 9, 11, 12, 17, 20, 25, 27 \] ← in 25 & 27 draw pictures in the three vectors & projections

37, 43, 54 (this is called the parallelogram identity. why?) 61, 64, 65, 69, 73, 76