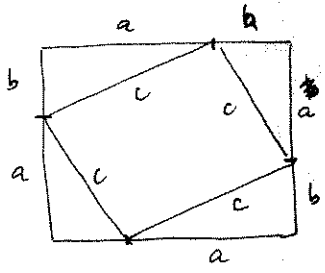
Homework Set #1 : Circled problems are to be handed in.
Due Friday 14 Jan. Others are recommended but not required.
(This week they're all circled)

① The Pythagorean Theorem says that for a right Δ, with legs a, b & hypotenuse c, $c^2 = a^2 + b^2$

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



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

ⓐ Draw the x-y-z axes as on page 2 of today's (1/10) notes, and then draw the coordinate box for P, as we did on page 2. (So P & the origin are opposite vertices.)

ⓑ Use inequalities to specify the region inside the box

ⓒ Use inequalities and the equality $x = 1$ to specify the "front" face of the box

ⓓ Use equalities and inequalities to specify (separately) the three edges which contain the point $(1, -2, 3) = P$

ⓔ How far is it from P to the origin?

ⓕ " " " " " to the x-y plane?

ⓖ " " " " to the x-axis?

③ Sketch pieces of the following planes (so that the viewer can visualize the entire plane)

ⓐ $2x + 6y + 3z = 12$ (this is 14.1 #17)

ⓑ $z = 2$ (14.1 #29a)

ⓒ $2x - y - z = 0$

④ Sketch (graph) the following

ⓐ $x^2 + y^2 + z^2 = 9$ (14.1 #23)

ⓑ $x^2 + y^2 + z^2 \leq 9$

ⓒ $x^2 + y^2 = 4$ (14.1 #29c)

ⓓ $x^2 + y^2 \leq 4$

⑤ Show that (4,5,3), (1,7,4), (2,4,6) are vertices of an equilateral triangle.
Hint: distance formula (14.1 #6)