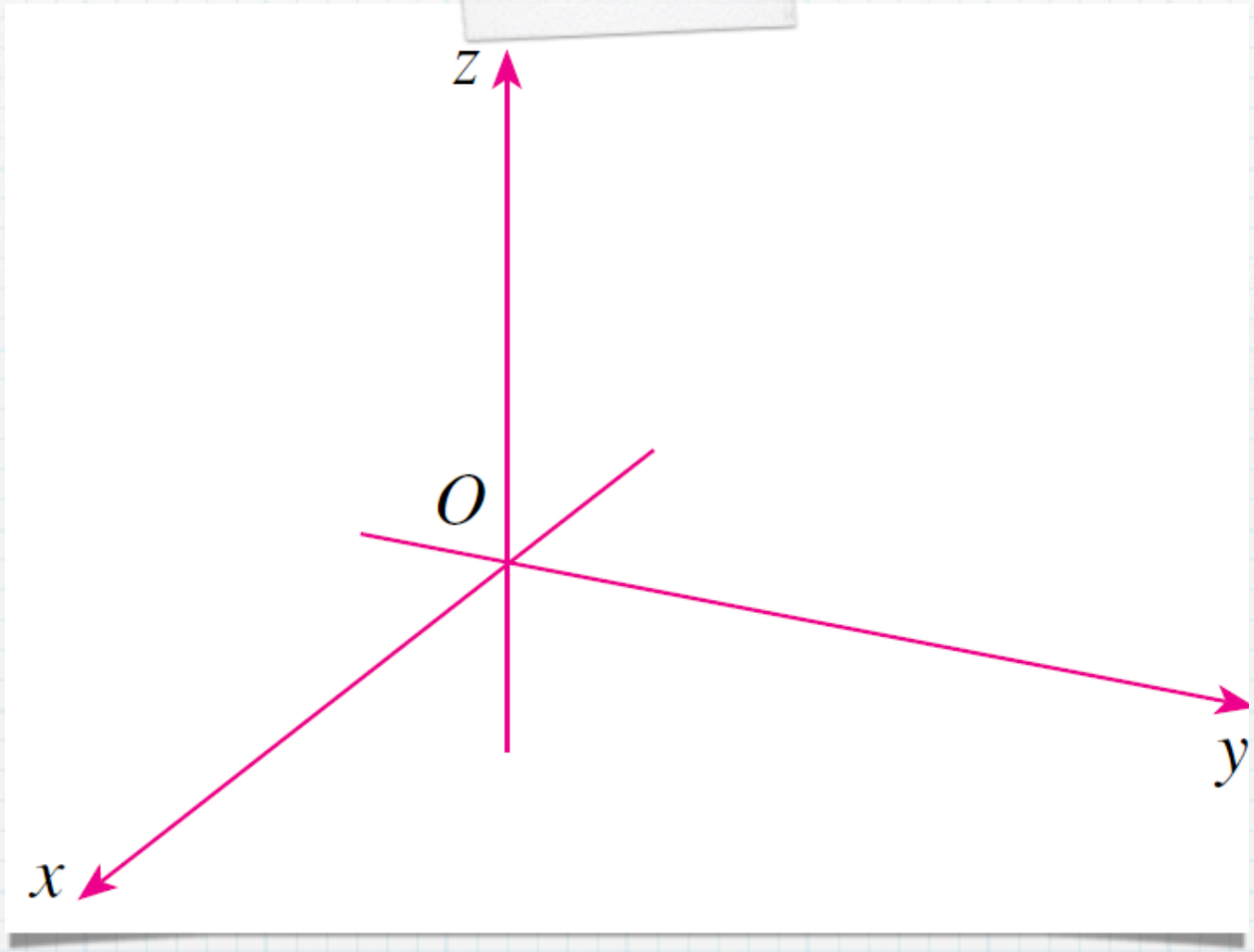
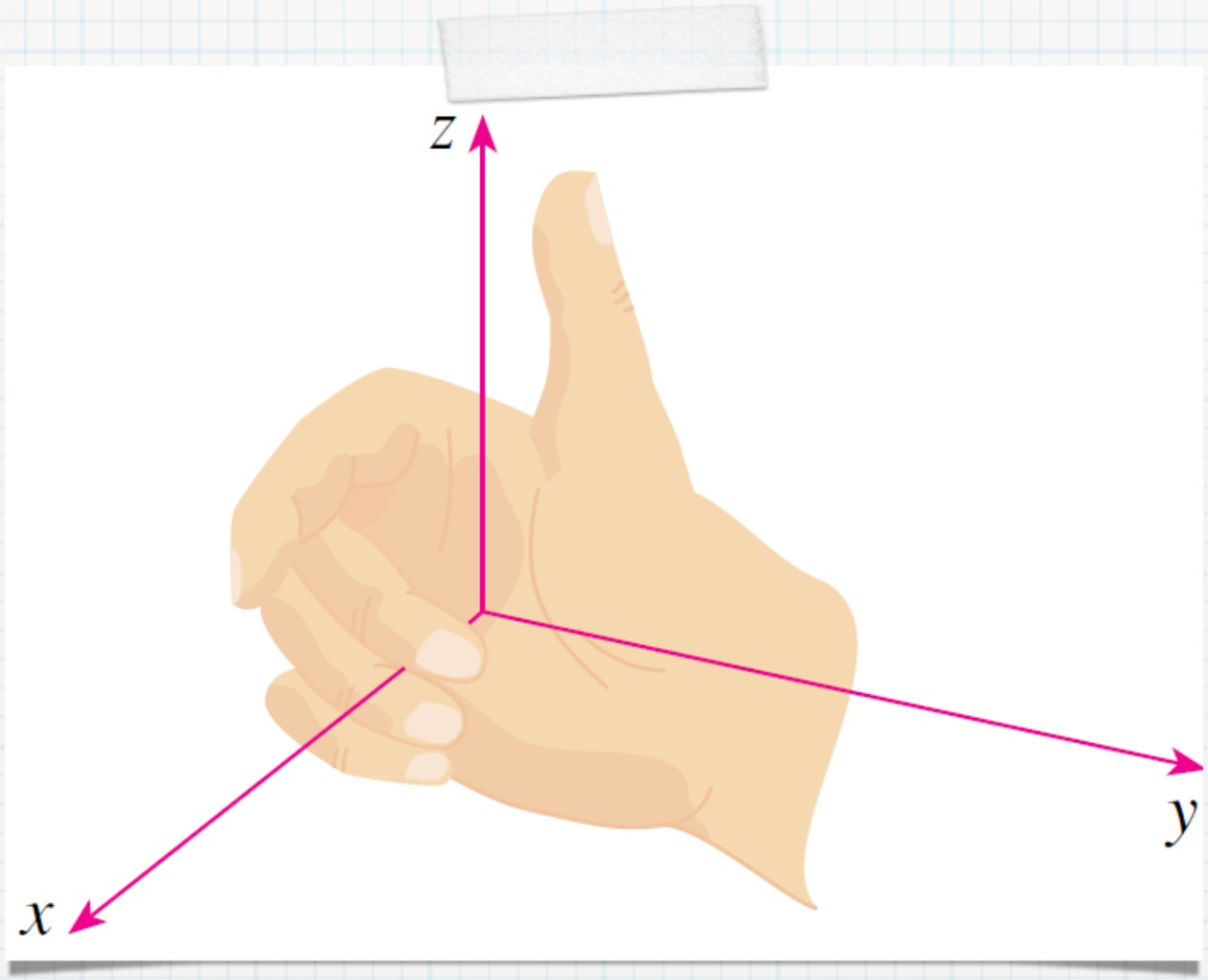
Section 9.1

3D coordinate systems



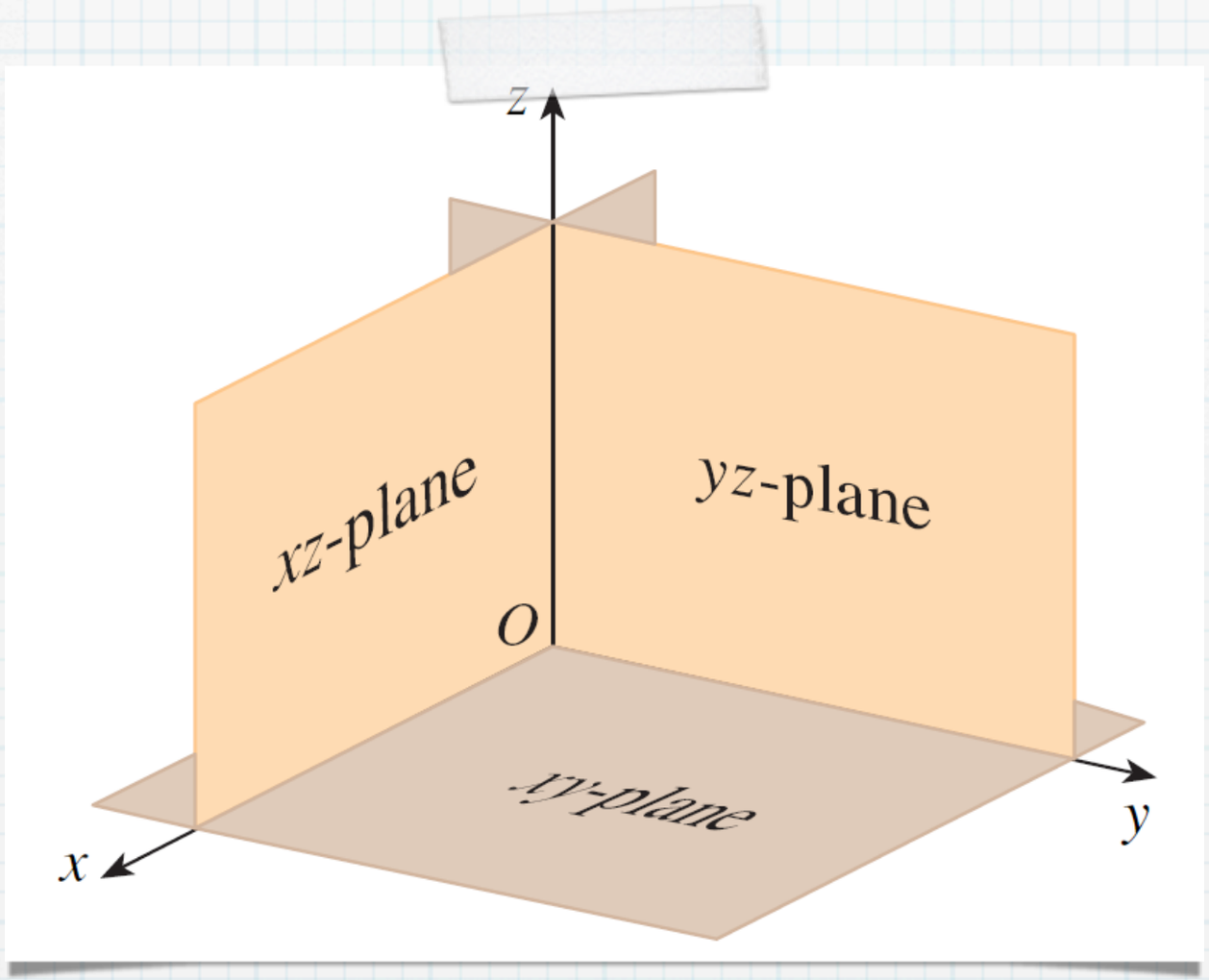
Rectangular Coordinates



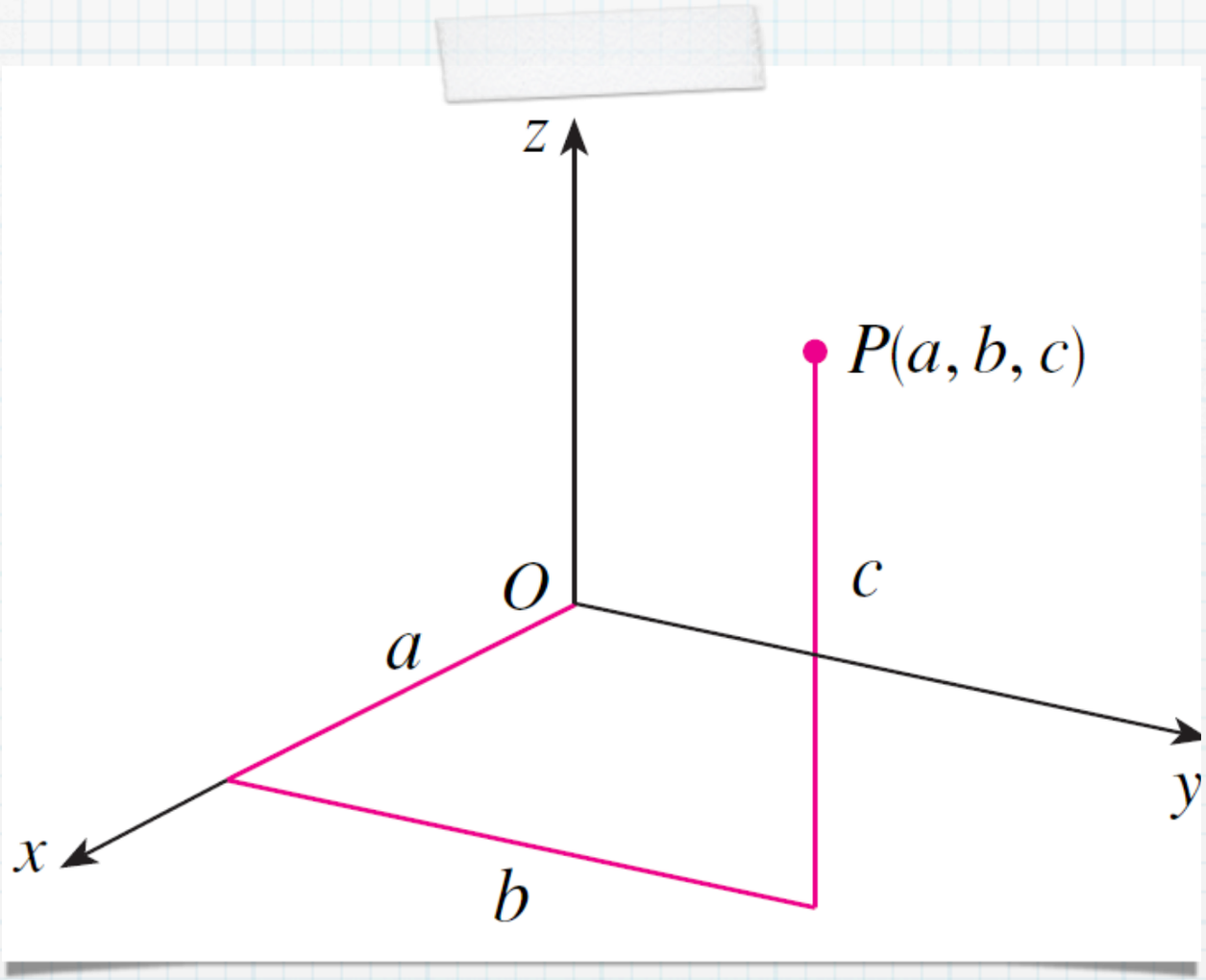
Right Hand Rule

To Do

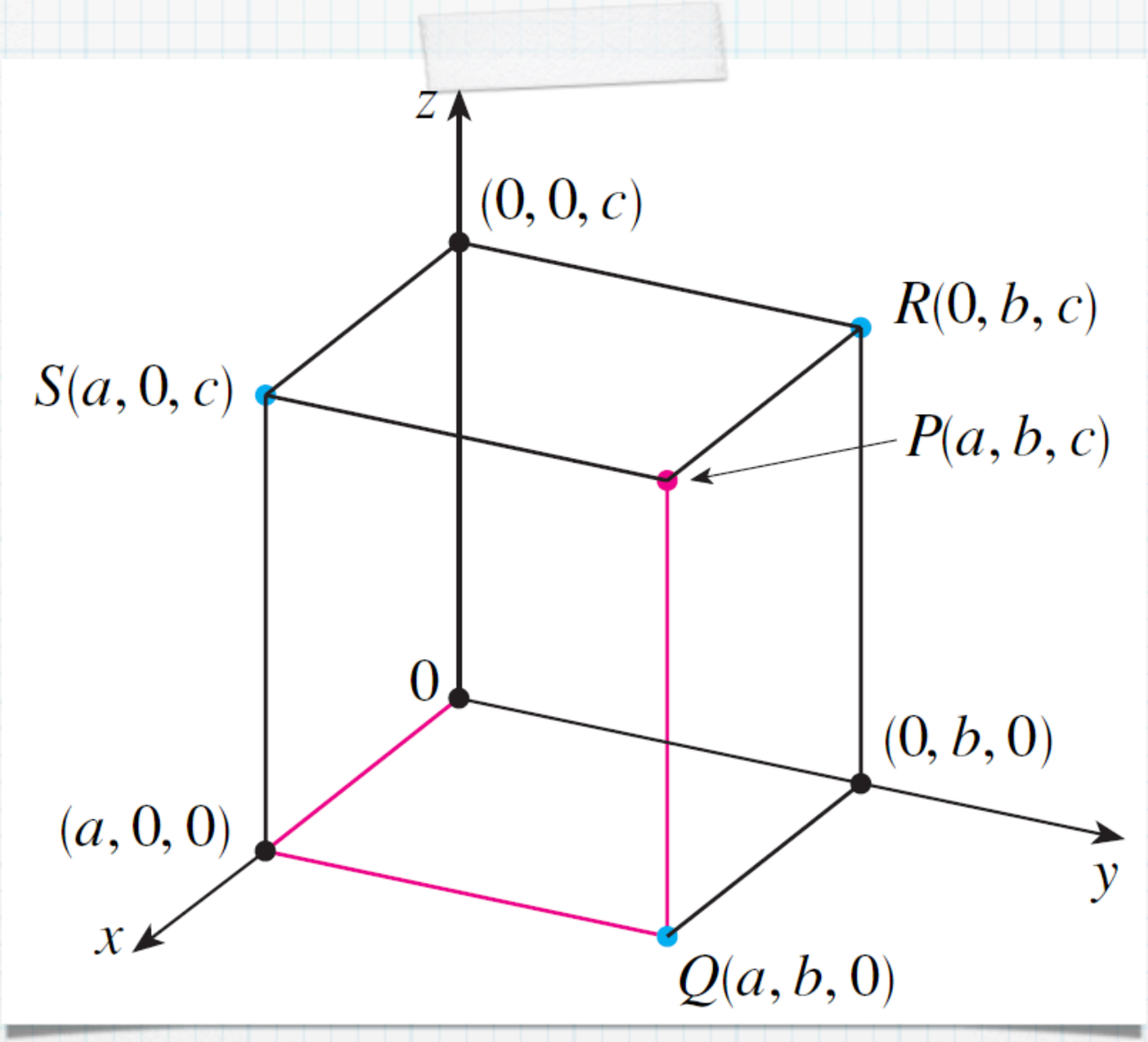
* Create a set of coordinate axes
* Do the 3D coordinate axes worksheet.



Coordinate Planes



Coordinates



Projections

The Space R^3

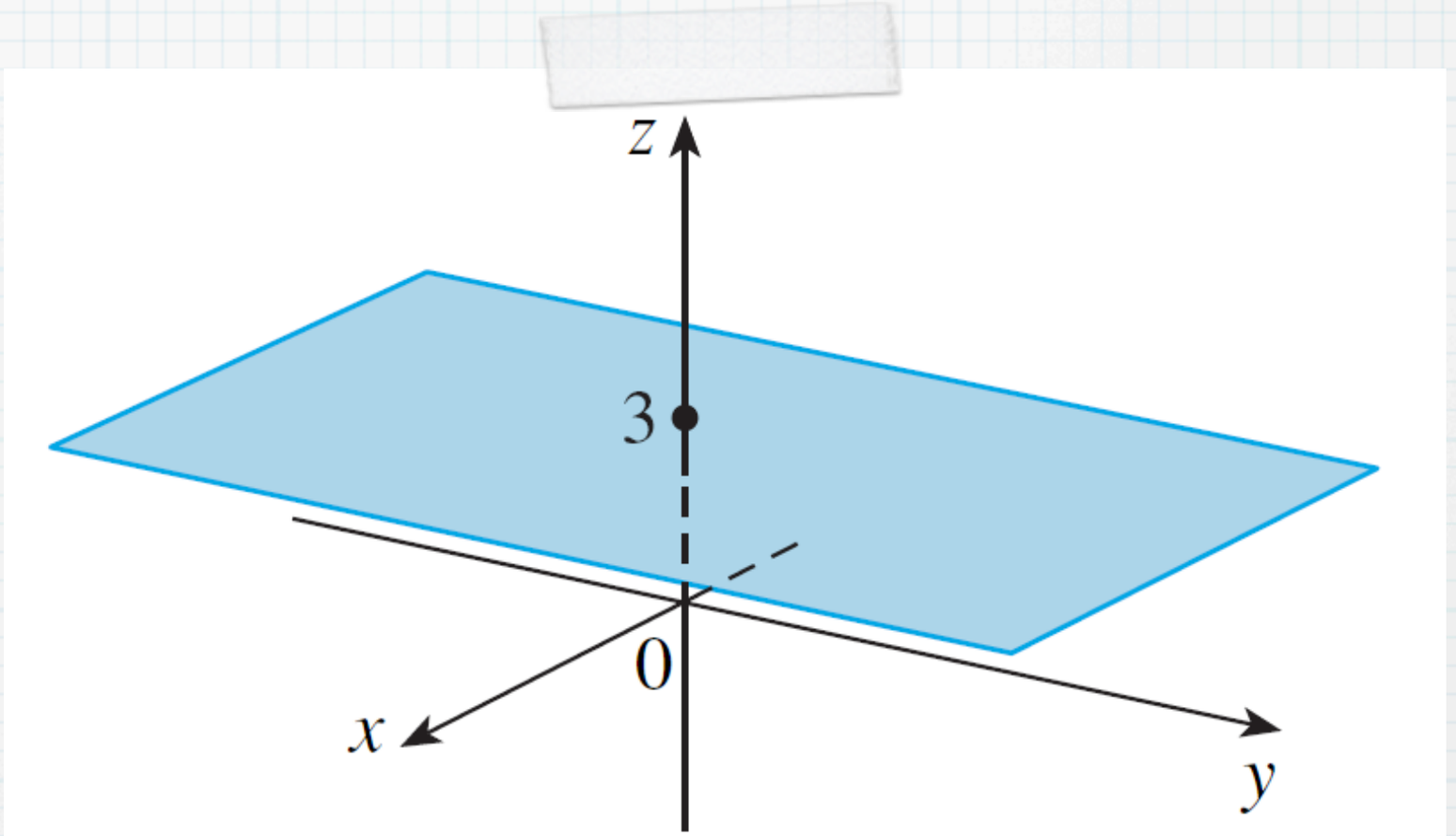
* Cartesian Product:
  $RxRxR=\{(x,y,z) \mid x,y,z \text{ real numbers}\}$
* Set of all ordered triples

To Do

* Points in the xyz coordinate system worksheet

Surfaces in R^3

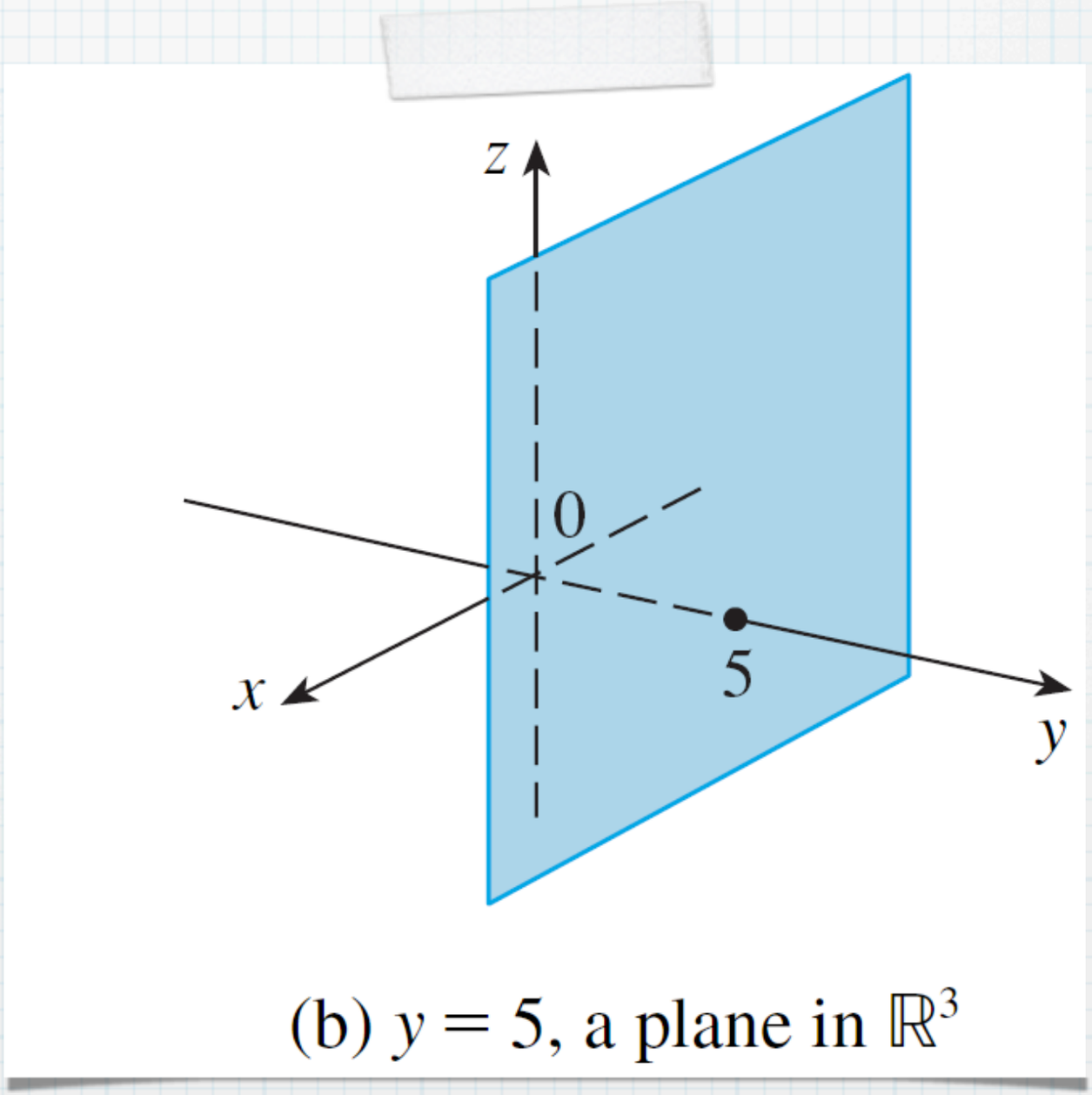
* z=3



(a) $z = 3$, a plane in $\mathbb{R}^3$

Surfaces in R^3

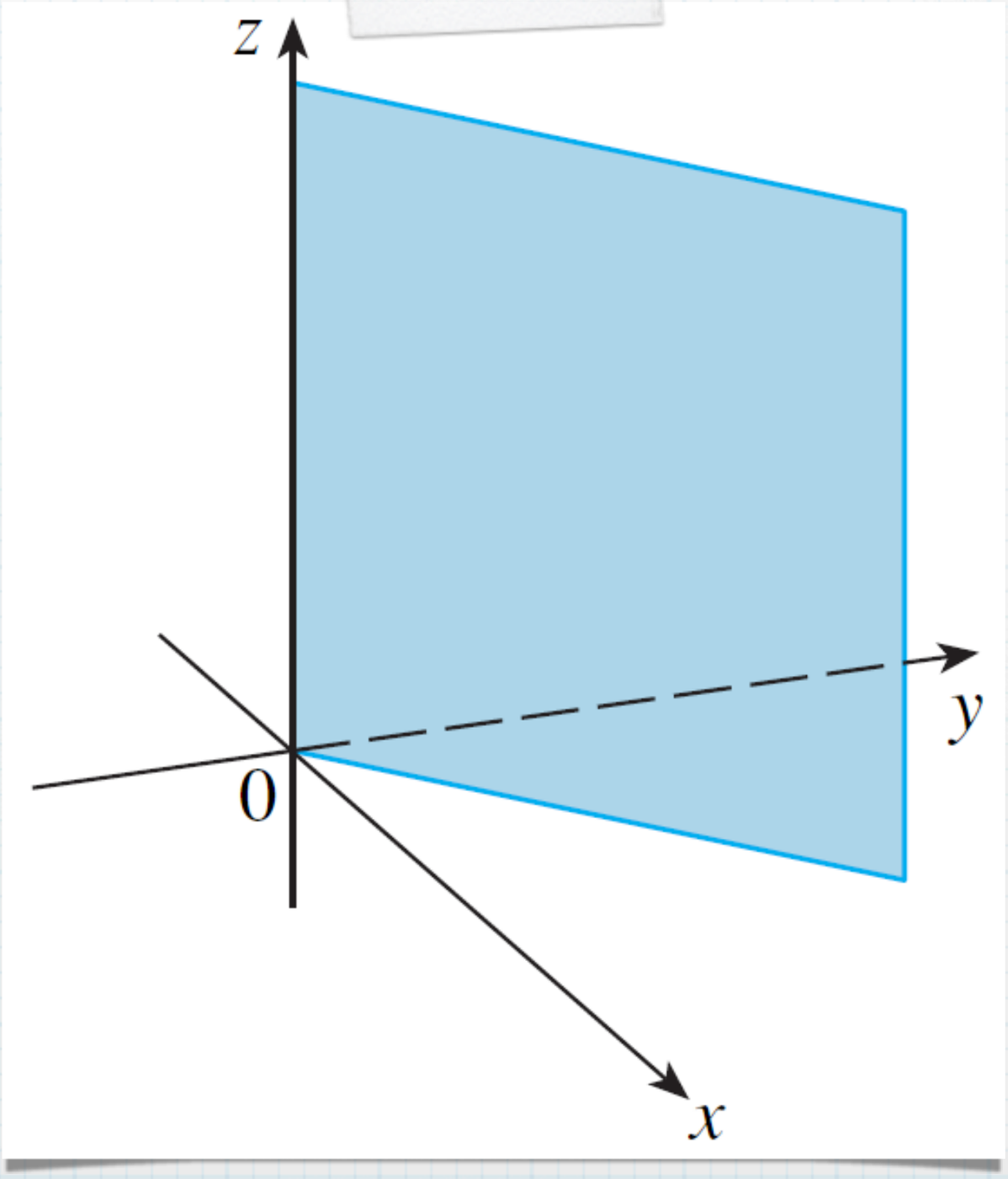
* y=5



(b) $y = 5$, a plane in $\mathbb{R}^3$

Surfaces in R^3

* y=x



To Do

* Section 9.1 Group Work: Fun with Visualization
* Working with surfaces in 3D space

Other Formulas

* Distance Formula
* Equation of a Sphere

Distance Formula in Three Dimensions The distance $|P_1P_2|$ between the points $P_1(x_1, y_1, z_1)$ and $P_2(x_2, y_2, z_2)$ is

$$|P_1P_2| = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$$

Equation of a Sphere An equation of a sphere with center $C(h, k, l)$ and radius r is

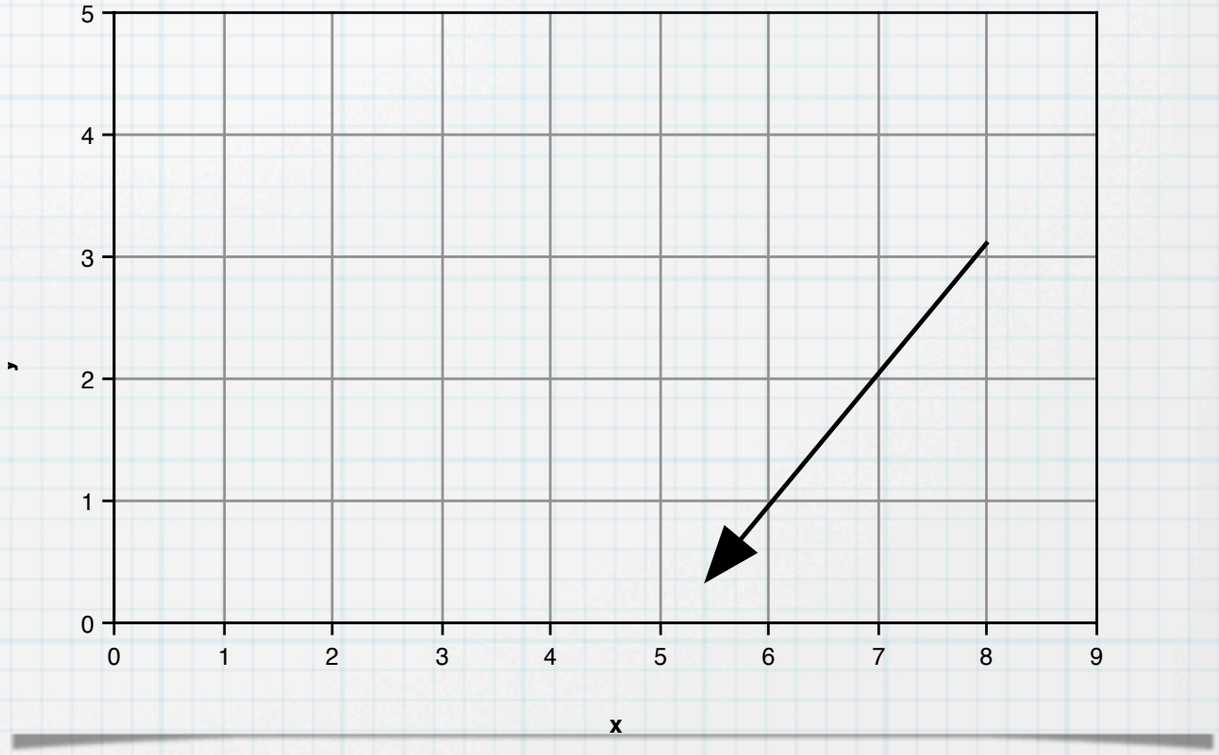
$$(x - h)^2 + (y - k)^2 + (z - l)^2 = r^2$$

In particular, if the center is the origin O, then an equation of the sphere is

$$x^2 + y^2 + z^2 = r^2$$

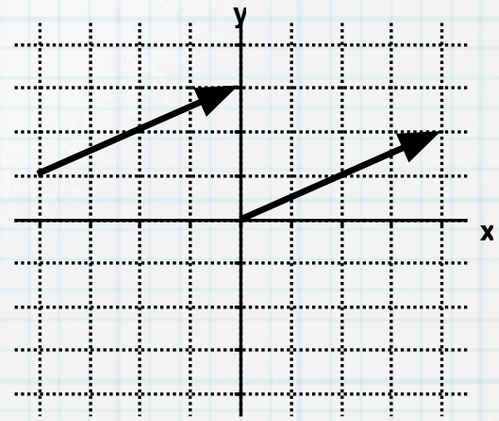
Vectors

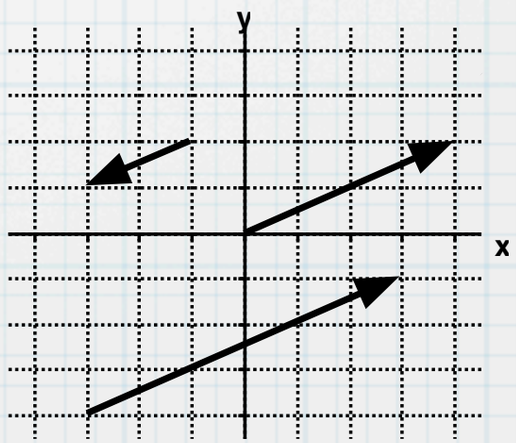
* 2D Vectors
* Initial point (Tail)
* Terminal point (Head)
* Components



Terminology and Notation

* Points
* Components
* Standard Position
* Parallel
* Length (Magnitude)





To Do

* Vectors in the plane Worksheet

To Do

* Read Sections 9.1-9.4
* Answer the Reading Questions
* Do WebAssign Assignment 1
* Finish all in-class worksheets
* Do Mathematica 1 Assignment