

Math 8
Fall 2019

Written Homework
Assigned Monday, October 7

Note: Standard (not preliminary) written homework is graded on your work and your explanations, not just on your answer.

Explanations are important for many reasons. Being able to communicate what you know shows a depth of understanding beyond that of being able to get the right answer to a problem. Doing the mental work of putting explanations into words helps create that depth of understanding. On exams, we will grade your work and not just your answers, so this is good practice for taking exams.

For all these reasons, be sure to: show all your work; explain your reasoning; use clear English; write neatly so all this effort does not go to waste.

Written homework is always due at 10:00 AM on the following Monday.

1. Find the center and radius of each sphere. (You may have to complete the square.)

Sphere 1: $(x - 1)^2 + (y + 1)^2 + z^2 = 16$

Sphere 2: $x^2 + y^2 + z^2 - 4x - 2z + 4 = 0$

Sphere 3: $x^2 - 4x + y^2 - 6y + z^2 + 6z = -6$

Sphere 4: $x^2 - 6x + y^2 + 2y + z^2 = -9$

2. For each of the following pairs of spheres, choose the correct relationship from the options listed below. Be sure to explain your reasoning.

- (a) Sphere 1 and Sphere 2
- (b) Sphere 1 and Sphere 3
- (c) Sphere 1 and Sphere 4
- (d) Sphere 2 and Sphere 3

(Note that a sphere is the *surface* of a solid ball. For example, if two spheres have the same center and different radii, they do not intersect at all, and the smaller one is contained inside the larger one.)

- The spheres intersect in a circle.
- The spheres do not intersect at all, and one is contained inside the other.
- The spheres do not intersect at all, and neither is contained inside the other.
- The spheres meet at a single point, and one is contained inside the other.
- The spheres meet at a single point, and neither is contained inside the other.