Handout 5: Identical And Fraternal Solids

1. Two triangular prisms have base lengths of 12 and 8, base heights of 9 and 6, and heights of 18 and 12, respectively. Are they similar, congruent, or neither?

2. A cylinder has a diameter of 20 and a height of 45. Another cylinder has a radius of 10 and a diagonal of 33. Are the cylinders similar, congruent, or neither?

3. A sphere has a radius of 14. Another sphere has a circumference of 28π. Are the spheres similar, congruent, or neither?

4. Find the midpoint and distance between the points $(3, 4, 8)$ and $(5, 2, 2)$.

5. A solid has vertices at $(0, 0, 0)$, $(3, 0, 0)$, $(0, 2, 0)$, $(0, 0, 4)$, $(3, 0, 4)$, and $(0, 2, 4)$. What kind of solid is it?

6. A triangular prism has vertices at $(0, 0, 0)$, $(4, 0, 0)$, $(1, 4, 0)$, $(0, 0, 6)$, $(4, 0, 6)$, and $(1, 4, 6)$. If the prism is dilated to 5 times its current size, what will the vertices be?

7. A rectangular has vertices at $(0, 0, 0)$ and $(7, 2, 3)$, and they don't share a face. Find the surface area and volume of the prism.

8. A square pyramid has vertices at $(0, 0, 0)$, $(6, 0, 0)$, $(6, 0, 6)$, $(0, 0, 6)$, and an apex at $(3, 6, 3)$. Find the surface area and volume of the pyramid.

9. Two rectangular prisms lie on the same grid. One has vertices that don't share a face at $(0, 0, 0)$ and $(4, 2, 4)$, while another has vertices that don't share a face at $(4, 2, 4)$ and $(6, 3, 6)$. Are the two prisms congruent, similar, or neither?

10. One pyramid has vertices at $(0, 0, 0)$, $(0, 0, 4)$, $(4, 0, 0)$, and $(2, 2, 2)$. Another pyramid has vertices at $(-4, 8, 4)$, $(-4, 8, 8)$, $(0, 8, 4)$, and $(-2, 10, 6)$. Are the pyramids congruent, similar, or neither?