Handout 5: Identical And Fraternal Solids
Answers

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?

   Similar with a scale ratio of $3:2$.

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?

   Neither similar nor congruent.

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

   Congruent.

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

   The distance is about 6.6 units and the midpoint is $(4,3,5)$.

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?

   Right triangular prism.

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?

   $(0,0,0)$, $(20,0,0)$, $(5,20,0)$, $(0,0,30)$, $(20,0,30)$, and $(5,20,30)$.

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.

   $SA = 82$ units^2, $V = 42$ units^3

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.

   $SA \approx 116.5$ units^2, $V = 72$ units^3

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?

   They are similar. Their scale factor is 0.5.

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?

    Congruent.