Math 3: Comparing Volume - HONORS

- 1. A standard sized sheet of paper measures 8.5 inches by 11 inches. Use two standard sized sheets of paper to create two cylinders. One cylinder should have a height of 11 inches and the other cylinder should have a height of 8.5 inches.
 - a. Carol predicts that the cylinder with a height of 11 inches has a greater volume. Lois predicts that the cylinder with a height of 8.5 inches has a greater volume. Stu predicts that the two cylinders have the same volume. Predict which cylinder has the greatest volume.
 - b. Determine the radius and height of each cylinder without using a measuring tool.

c. Calculate the volume of each cylinder to prove or disprove your prediction and determine who was correct.

d. Does the radius or the height have a greater impact on the magnitude of the volume? Explain your reasoning.

e. Consider the volume of the cylinder with a height of 8.5 inches. What radius would be required to create a cylinder with a height of 11 inches that has the same volume?

- 2. Do you think altering the radius measurement by a magnitude of 2 or the height by a magnitude of 3 would affect the volume of a cylinder more?
 - a. If you alter the radius by a magnitude of 2, how does the volume of a cylinder change?

- b. If you alter the height by a magnitude of 3, how does the volume of a cylinder change?
- c. Was your prediction accurate? Explain why.

- 3. Do you think altering the radius by a magnitude of .5 or the height by a magnitude of .25 would affect the volume of a cone more?
 - a. If you alter the radius by a magnitude of .5, how does the volume of a cone change?

b. If you alter the height by a magnitude of .25, how does the volume of a cone change?

c. Was your prediction accurate? Explain why.

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- 1. A standard sized sheet of paper measures 8.5 inches by 11 inches. Use two standard sized sheets of paper to create two cylinders. One cylinder should have a height of 11 inches and the other cylinder should have a height of 8.5 inches.
 - a. Carol predicts that the cylinder with a height of 11 inches has a greater volume. Lois predicts that the cylinder with a height of 8.5 inches has a greater volume. Stu predicts that the two cylinders have the same volume. Predict which cylinder has the greatest volume.
 - b. Determine the radius and height of each cylinder without using a measuring tool.

c. Calculate the volume of each cylinder to prove or disprove your prediction and determine who was correct.

d. Does the radius or the height have a greater impact on the magnitude of the volume? Explain your reasoning.

e. Consider the volume of the cylinder with a height of 8.5 inches. What radius would be required to create a cylinder with a height of 11 inches that has the same volume?

2. Do you think increasing the radius measurement by 1 foot or the height measurement by 2 feet would affect the volume of a cylinder more?

 $V = \pi r^2 h$

- a. Cylinder 1 has a radius and height of 1 foot. Find the volume of cylinder 1.
- b. Cylinder 2 has a radius of 2 feet and a height of 1 foot. Find the volume of cylinder 2. How did the volume of Cylinder 1 change?
- c. Cylinder 3 has a radius of 1 foot and a height of 3 feet. Find the volume of cylinder 3. How did the volume of Cylinder 1 change?
- d. Based on the volume of cylinder 2 and cylinder 3, does increasing the radius measurement or the height measurement of a cylinder affect the volume more?
- 3. Do you think decreasing the radius measurement by a half or the height measurement by three fourths would affect the volume of the cone more?

$$V = \frac{1}{3}\pi r^2 h$$

- a. Cone 1 has a radius and height of 1 foot. Find the volume of that cone 1.
- b. Cone 2 has a radius of 0.5 feet and a height of 1 foot. Find the volume of cone 2. How did the volume of Cone 1 change?
- c. Cone 3 has a radius of 1 foot and a height of 0.25 feet. Find the volume of cone 3. How did the volume of Cone 1 change?
- d. Based on the volume of cone 2 and cone 3, does decreasing the radius measurement or the height measurement of a cone affect the volume more?