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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 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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4. 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?
5. 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?

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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?

