

Lesson 1: Solids of Rotation

- Let's rotate two-dimensional shapes to make three-dimensional shapes.

1.1: Which One Doesn't Belong: Solids

Which one doesn't belong?

A



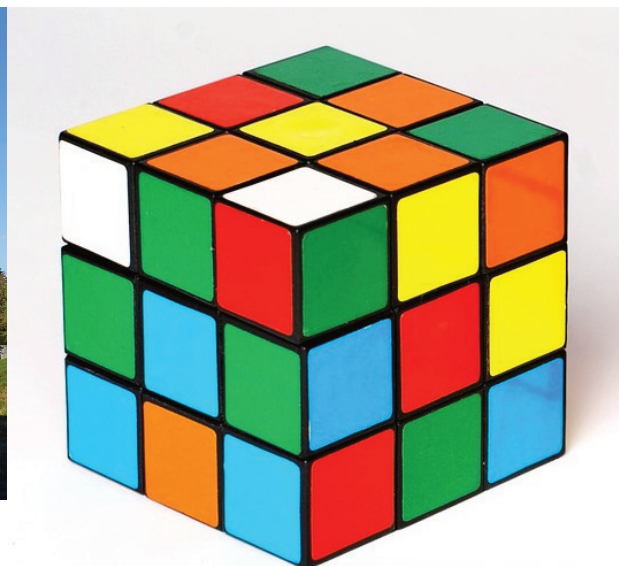
B



C



D



Are you ready for more?

1. Graph $y = -x + 3$ from $x = 1$ to $x = 3$.


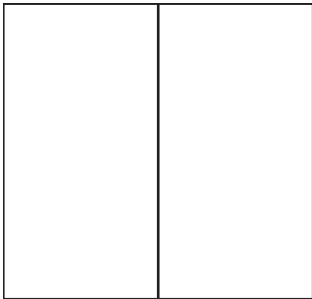

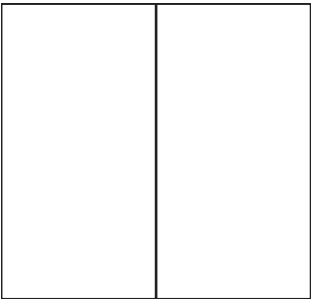

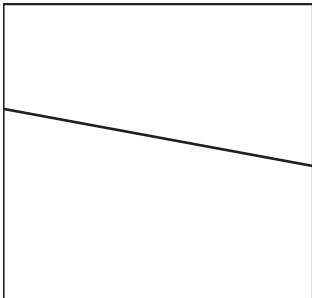

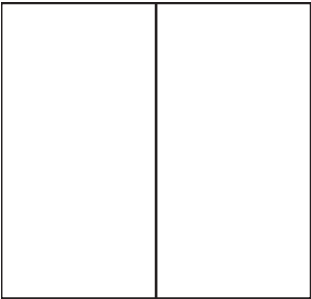
2. Sketch the solid of rotation generated by rotating this line using the y -axis as the axis of rotation.

3. What figure is made?

4. The object being rotated here is a line, not a two-dimensional object like in the lesson. How does this affect the result of the rotation?

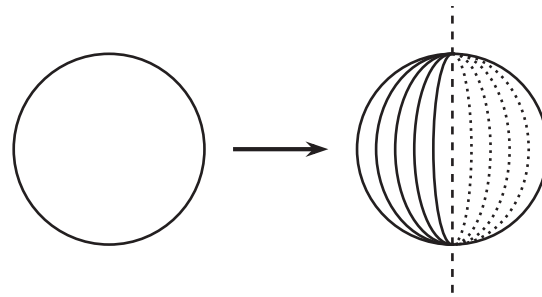
1.3: From Three Dimensions to Two

Draw the two-dimensional shape that, when rotated using the given **axis of rotation**, produces each **solid of rotation**. Ignore any non-symmetric aspects of the solid.

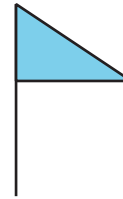
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Lesson 1 Summary

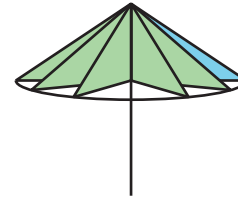
Take a coin and spin it on its edge. Give it good speed and make sure it stays vertical. What shape do you see? When you spin the coin, you should see a sphere.



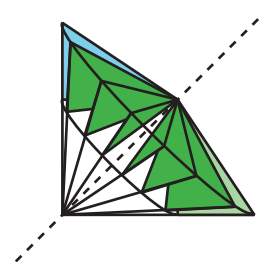
This triangular flag is made of metal. What shape will you see if the pole is spun quickly?



When the flag rotates with the pole, you should see a cone.



In both pictures, the object spins around a line called the **axis of rotation**, and the solid created is called the **solid of rotation**. If you were to spin the flag using a different axis of rotation, you would see a different solid of rotation. This is what it looks like when the flag is rotated using a different axis of rotation.



A machine called a lathe cuts away at a rotating block of material. For example, a lathe could be used to make a decorative sculpture shaped like the figure on the right from a block of wood. The image on the left shows the cross-sectional shape that would remain after the lathe carved away part of the spinning block of wood. If we rotate this two-dimensional shape using the vertical axis shown, it produces the sculpture shape.

