Solids of Revolution

General instructions: When calculating volumes of cylinders and cones, give your answer both in terms of π and also as a decimal accurate to three decimal places. Use the π key on your calculator and then round your answer as the last step.

1. a) Draw line segments joining the points (0, 0), (0, 2), (3, 2), and (3, 0).

   b) Calculate the area of the region formed.

   c) Draw and describe the solid formed by revolving the region about the *x*-axis.

   d) Calculate the volume of the solid formed.

   e) Draw and describe the solid formed by revolving the region about the *y*-axis.

   f) Calculate the volume of the resulting solid.

   g) Compare the volume in parts (d) and (f). Explain why these volumes are different.

2. a) Draw line segments joining the points (0, 0), (0, 3), and (2, 0).

   b) Calculate the area of the region formed.

   c) Draw and describe the solid formed by revolving the region about the *x*-axis.

   d) Calculate the volume of the solid formed.

   e) Draw and describe the solid formed by revolving the region about the *y*-axis.

   f) Calculate the volume of the resulting solid.

   g) Compare the volume in parts (d) and (f). Explain why these volumes are different.

3. a) Draw line segments joining the points (0, 0), (0, 1), and (5, 0).

   b) Calculate the area of the region formed.

   c) Draw and describe the solid formed by revolving the region about the *x*-axis.

   d) Calculate the volume of the solid formed.

   e) Draw and describe the solid formed by revolving the region about the *y*-axis.

   f) Calculate the volume of the resulting solid.

   g) Compare the volume in parts (d) and (f). Explain why these volumes are different.

4. a) Draw line segments joining the points (0, 0), (0, 3), (5, 3), and (5, 0).
   b) Calculate the area of the region formed.
   c) Draw and describe the solid formed by revolving the region about the x-axis.
   d) Calculate the volume of the solid formed.
   e) Draw and describe the solid formed by revolving the region about the vertical line $x = 5$.
   f) Calculate the volume of the resulting solid.

5. a) Draw line segments joining the points (0, 0), (0, 5), (2, 3), and (2, 0).
   b) Calculate the area of the region formed.
   c) Draw and describe the solid formed by revolving the region about the y-axis.
   d) Calculate the volume of the solid formed.

6. a) Draw line segments joining the points (0, 0), (2, 4), and (2, 0).
   b) Calculate the area of the region formed.
   c) Draw and describe the solid formed by revolving the region about the x-axis.
   d) Calculate the volume of the solid formed.
   e) Draw and describe the solid formed by revolving the region about the vertical line $x = 2$.
   f) Calculate the volume of the resulting solid.
   g) Draw and describe the solid formed by revolving the region about the y-axis.
   h) Calculate the volume of the solid formed.