Find the volume of the figure created by revolving each region bounded by the curves about the given line.

1. \( y = -\frac{2}{3}x + 4 \), the x-axis, and the y-axis about:
   
   a) the x-axis
   
   \[
   V = \int_0^6 \pi \left( \frac{2}{3}x + 4 \right)^2 \, dx
   \]
   
   \[
   = \pi \left[ \frac{4}{9}x^3 + \frac{16}{3}x^2 + 16x \right]_0^6
   \]
   
   \[
   = \pi \left[ 32 - 96 + 96 \right]
   \]
   
   \[
   = 32\pi
   \]
   
   b) the y-axis
   
   \[
   y = -\frac{2}{3}x + 4
   \]
   
   \[
   3y = -2x + 12
   \]
   
   \[
   2x = -3y + 12
   \]
   
   \[
   x = -\frac{3}{2}y + 6
   \]
   
   \[
   V = \int_0^4 \pi \left( \frac{3}{2}y + 6 \right)^2 \, dy
   \]
   
   \[
   = \pi \left[ \frac{9}{4}y^3 + 18y^2 + 36y \right]_0^4
   \]
   
   \[
   = \pi \left[ 32 - 96 + 96 \right]
   \]
   
   \[
   = 32\pi
   \]

2. \( y = \sqrt{x} \), \( x = 4 \), and the x-axis about:
   
   a) the x-axis
   
   \[
   V = \int_0^4 \pi \left( \sqrt{x} \right)^2 \, dx
   \]
   
   \[
   = \pi \left[ \frac{1}{2}x^2 \right]_0^4
   \]
   
   \[
   = \pi \left[ 8 \right]
   \]
   
   \[
   = 8\pi
   \]
   
   b) \( x = 4 \)
   
   \[
   V = \int_0^2 \pi \left( 4 - \sqrt{y} \right)^2 \, dy
   \]
   
   \[
   = \pi \left[ \frac{1}{8}y^2 + \frac{1}{2}y^2 + 16 - 2y \right]_0^2
   \]
   
   \[
   = \pi \left[ 64 - \frac{64}{3} + \frac{24}{3} \right]
   \]
   
   \[
   = 256\pi
   \]
3. \( y = e^x, \ x = 3, \) the \( x \)-axis, and the \( y \)-axis about:
   a) the \( x \)-axis
   \[
   V = \int_0^3 \pi (e^x)^2 \, dx
   \]
   b) \( x = 3 \)
   \[
   \text{Two Volumes!}
   \]
   \[
   V_1 = \pi 3^2 - 1
   V_1 = 9\pi
   \]
   \[
   V_2 = \int_1^{e^3} \pi (3 - \ln y)^2 \, dy
   \]
   \[
   V_2 = 72.79408
   \]
   \[
   V_d = V_1 + V_2 = 101.068
   \]

6. Find the volume of the frustum of a cone on the right.
   Hint: The figure is a result of a rotation. So position it on the
   \( xy \)-plane in a way so the figure is the result of a
   line that has been rotated around the \( x \)-axis. Find the
   the equation of that line then apply the definite integral.

\[
V = \int_0^{10} \pi \left( \frac{1}{5}x + 8 \right)^2 \, dx
\]

**Answers:**

1a) 32\pi
2a) 632.134
b) 48\pi
c) 101.068
2a) 8\pi
6) 1480\pi/3
b) 256\pi/15