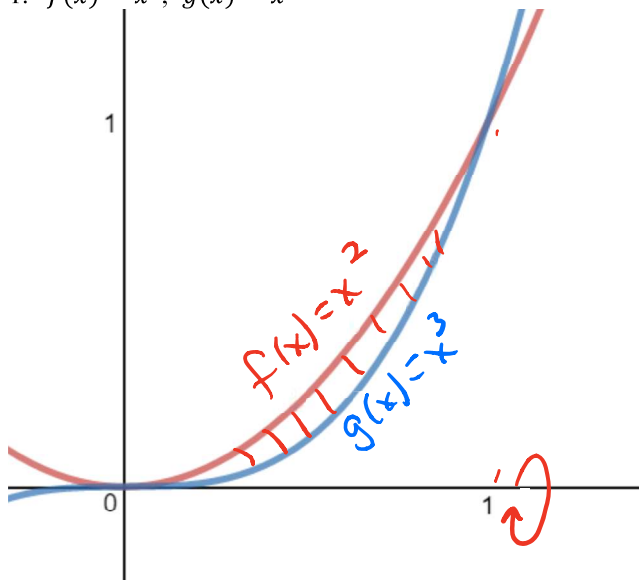## Homework 7.7

Find the volume of the solid formed by revolving it around the x-axis. Leave the answers in terms of π.

1. $f(x) = x^2, \ g(x) = x^3$

2. $f(x) = \sqrt{x}, \ h(x) = 0, \ g(x) = 2$

Problem 1:

② $R^2 = (x^2)^2 = x^4$
   $r^2 = (x^3)^2 = x^6$

③ $D = [0,1]$

④ $V = \pi \int_a^b [R^2 - r^2] dx$

$V = \pi \int_0^1 [x^4 - x^6] dx$

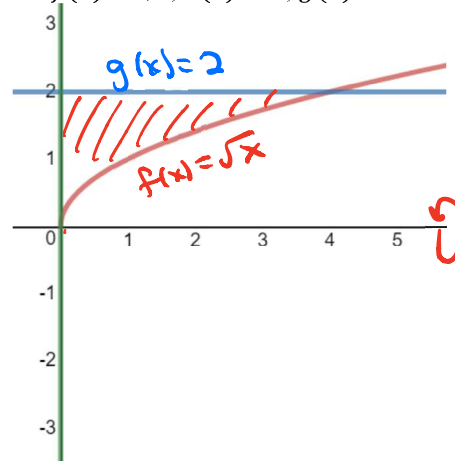$V = \pi \left[\frac{1}{5} x^5 - \frac{1}{7} x^7 \right] \Big|_0^1$

$V = \pi \left[\frac{1}{5}(1)^5 - \frac{1}{7}(1)^7 \right] - \pi \left[\frac{1}{5}(0)^5 - \frac{1}{7}(0)^7 \right]$

$V = \pi \left[\frac{1}{5} - \frac{1}{7} \right] - \pi [0]$

$V = \pi \left[\frac{7}{35} - \frac{5}{35} \right]$

$V = \frac{2}{35} \pi \ un^3$

Problem 2:

② $R^2 = (2)^2 = 4$
   $r^2 = (\sqrt{x})^2 = x$

③ $D = [0,4]$

④ $V = \pi \int_a^b [R^2 - r^2] dx$

$V = \pi \int_0^4 [4 - x] dx$

$V = \pi \left[4x - \frac{1}{2} x^2 \right] \Big|_0^4$
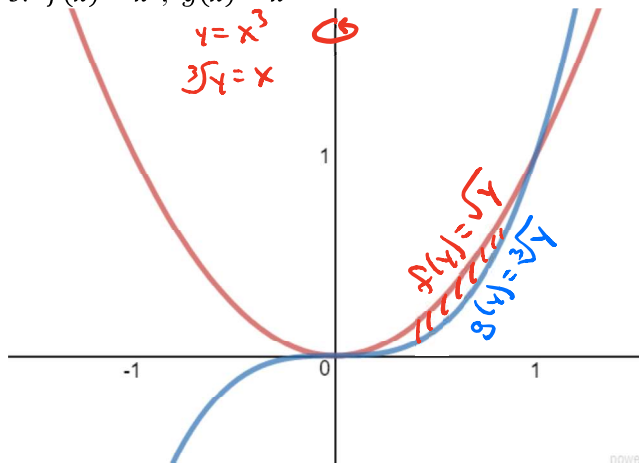
$V = \pi \left[4(4) - \frac{1}{2}(4)^2 \right] - \pi \left[4(0) - \frac{1}{2}(0)^2 \right]$

$V = \pi [16 - 8] - \pi [0]$

$V = 8\pi \ un^3$

Find the volume of the solid formed by revolving it around the y-axis. Leave the answers in terms of π.
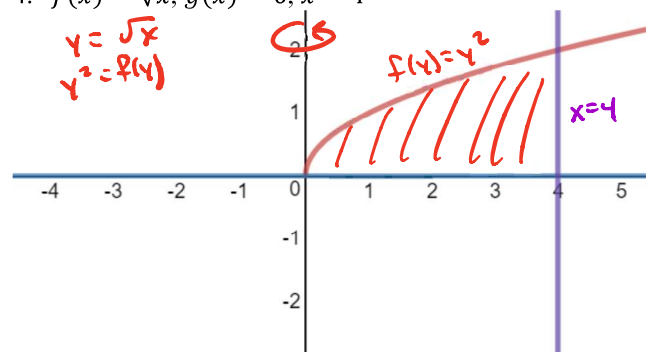
3. $f(x) = x^2$, $g(x) = x^3$

$y = x^3$

$\sqrt[3]{y} = x$

$f(y) = \sqrt{y}$

$g(y) = \sqrt[3]{y}$

4. $f(x) = \sqrt{x}$, $g(x) = 0$, $x = 4$

$y = \sqrt{x}$

$y^2 = f(y)$

$f(y) = y^2$

$x = 4$

3.

② $R^2 = \left(\sqrt[3]{y}\right)^2 = y^{2/3}$

$r^2 = \left(\sqrt{y}\right)^2 = y$

③ $D = [0, 1]$

④ $V = \pi \int_a^b \left[R^2 - r^2\right] dy$

$V = \pi \int_0^1 \left[y^{2/3} - y\right] dy$

$V = \frac{1}{10}\pi \ un^3$

4.

② $R^2 = (4)^2 = 16$

$r^2 = (y^2)^2 = y^4$

③ $D = [0, 2]$

④ $V = \pi \int_a^b \left[R^2 - r^2\right] dy$

$V = \pi \int_0^2 \left[16 - y^4\right] dy$

$V = \frac{128}{5}\pi \ un^3$