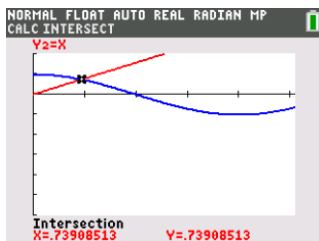# Calculator

What is the area of the region in the first quadrant enclosed by the graphs of $y = \cos x$, $y = x$, and the y-axis?

(A)   0.127   (B)   0.385   (C)   0.400   (D)   0.600   (E)   0.947

NORMAL FLOAT AUTO REAL RADIAN MP
CALC INTERSECT
Y2=X

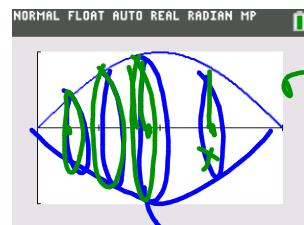Intersection
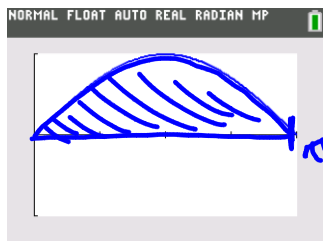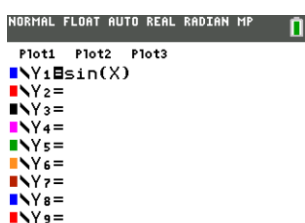X=.73908513   Y=.73908513

$$\int_0^{.73908J} (\cos x - x)\,dx$$

$.400$

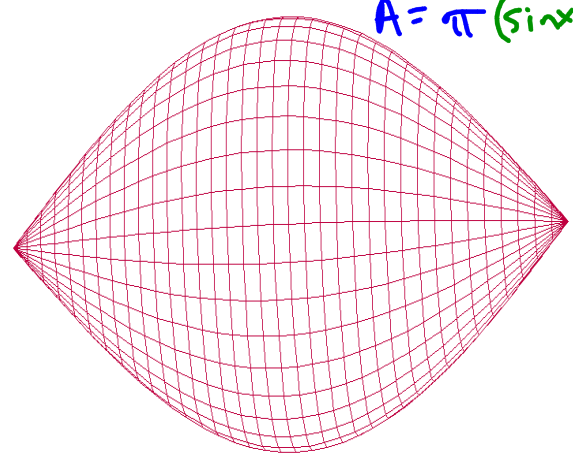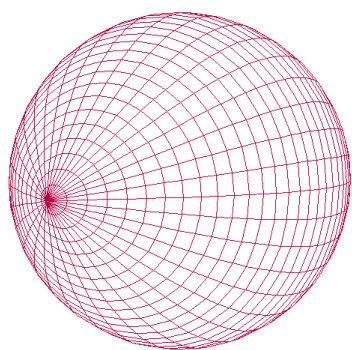# 7-3 day 1 Volumes: Disc Method

Learning Targets

I find the volume of a sold that has
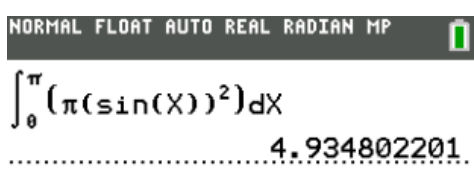been rotated around an axis using
the disc method.

Jan 7-8:37 AM

Discs

Ex1. Find the volume of the solid formed by revolving the area in the first quadrant bounded by f(x) = sin(x), the x-axis and x= π around the x-axis.

NORMAL FLOAT AUTO REAL RADIAN MP

Plot1 Plot2 Plot3
- \Y₁ = sin(X)
- \Y₂ =
- \Y₃ =
- \Y₄ =
- \Y₅ =
- \Y₆ =
- \Y₇ =
- \Y₈ =
- \Y₉ =

$r = \sin x$

$A = \pi r^2$

$A = \pi (\sin x)^2$

$$V = \int_{0}^{\pi} \pi (\sin x)^2 \, dx$$

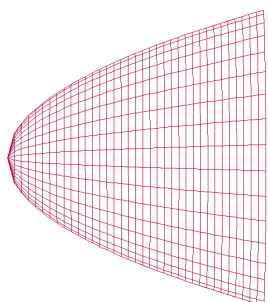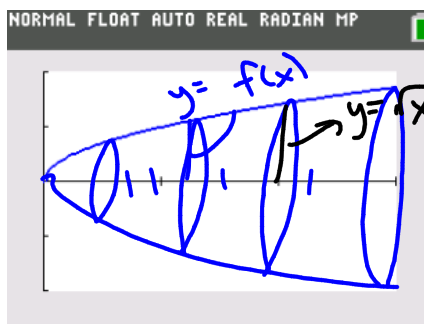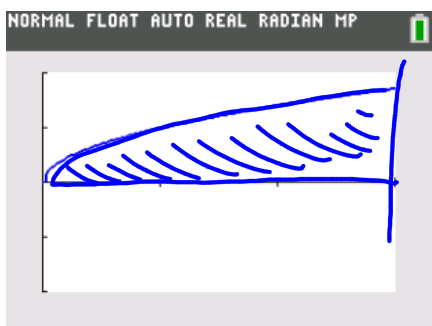NORMAL FLOAT AUTO REAL RADIAN MP

$\int_{0}^{\pi} (\pi(\sin(X))^2) dX$

         4.934802201

$V \approx 4.935 \, units^3$

Ex2. Given the function $f(x) = \sqrt{x}$

a.) Find the volume of the solid formed by revolving the area bounded by f(x), the x-axis and x=3 around the x-axis.
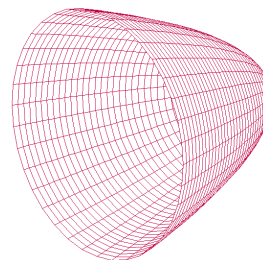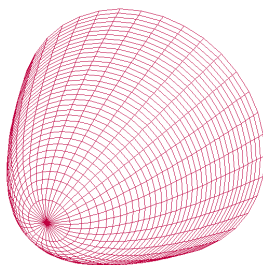
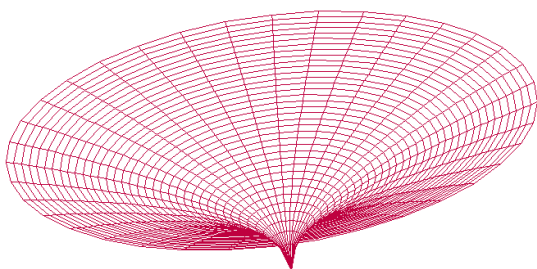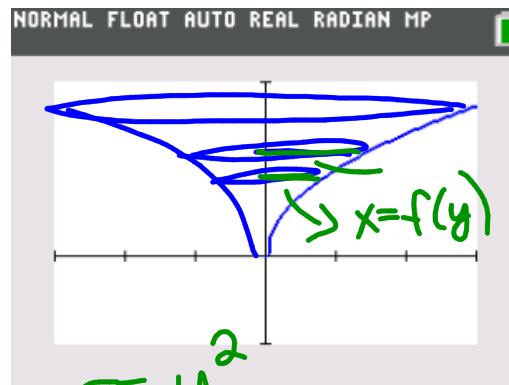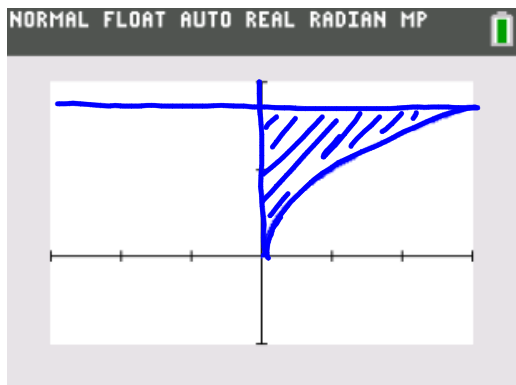$$\int_0^3 \pi (\sqrt{x})^2 \, dx = \int_0^3 \pi x \, dx = \boxed{14.137}$$

$$= \left. \frac{\pi x^2}{2} \right|_0^3$$

$$\frac{\pi (3)^2}{2} - \frac{\pi (0)^2}{2}$$

$$= \boxed{\frac{9\pi}{2}}$$

b) Find the volume of the solid formed by revolving the area bounded by f(x), the y-axis and $y = \sqrt{3}$ around the y-axis.

$y = \sqrt{x}$ $x = y^2$

$\gg x = f(y)$

$r = y^2$

$= \int_{0}^{\sqrt{3}} \pi (y^2)^2 \, dy$

$= \int_{0}^{\sqrt{3}} \pi y^4 \, dy$

$\int_{0}^{\sqrt{3}} (\pi Y^4) dY$

9.794516567

$\approx \boxed{9.795}$

c.) Find the volume of the solid formed by revolving the area bounded by $y = \sqrt{x}$, y-axis, x= 3 and y=-2 around the line y=-2.

$\sqrt{x} + 2$
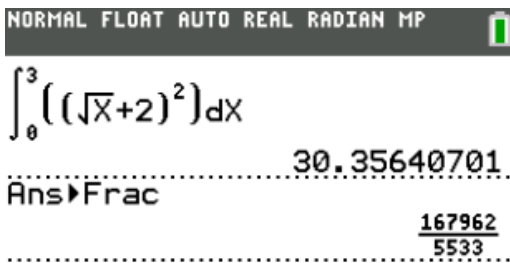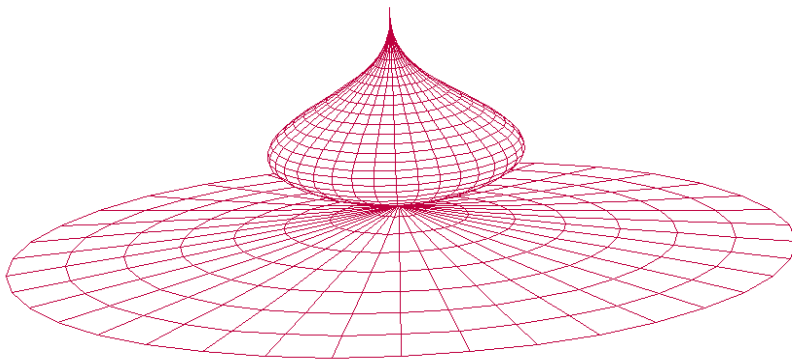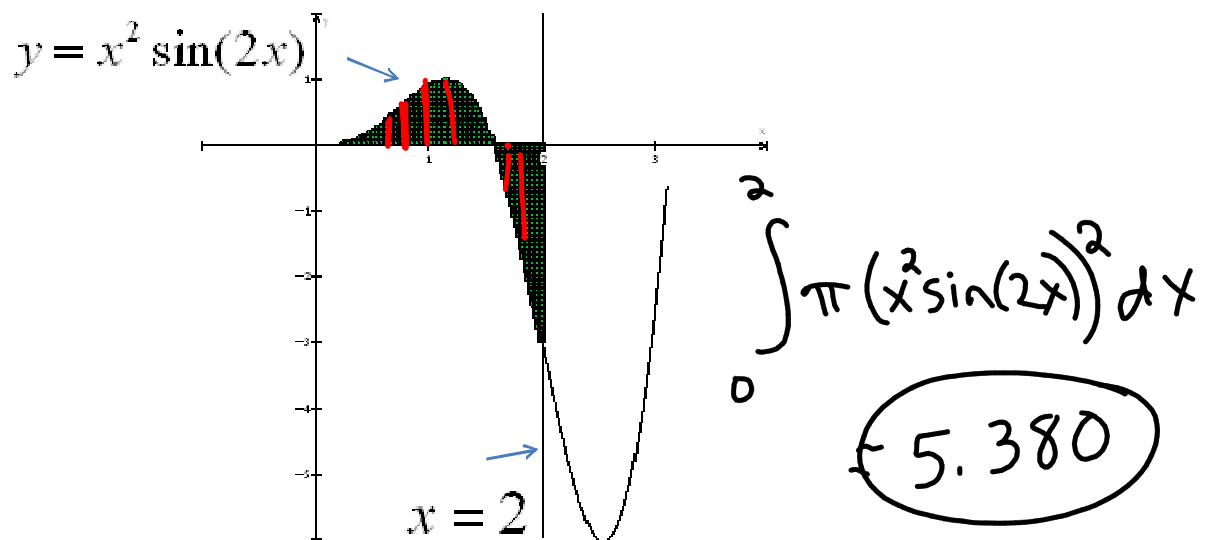

$r = \sqrt{x} + 2$

$$\int_{0}^{3} \pi (\sqrt{x} + 2)^2 \, dx$$

$\approx \boxed{95.367}$

$\int_{0}^{3} ((\sqrt{x}+2)^2) dx$

30.35640701

Ans▶Frac
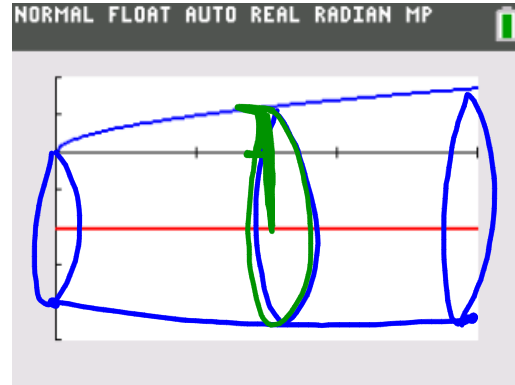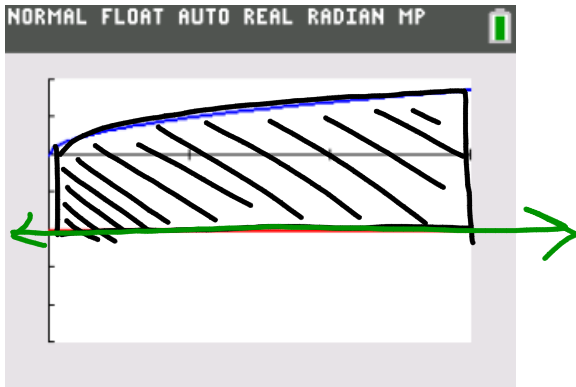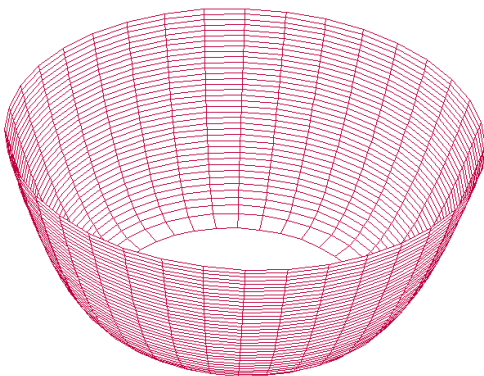
$\frac{167962}{5533}$

$\boxed{\dfrac{167942}{5533} \pi}$

Ex3. Find the volume formed by revolving the shaded area around the x-axis.

$y = x^2 \sin(2x)$

$x = 2$

$$\int_0^2 \pi \left(x^2 \sin(2x)\right)^2 dx$$

≈ 5.380

Homework

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