Find the area of the region between these two curves

$$y = 12 - x^2$$

$$y = 2x^2$$

Find the area of the region between these two curves

$$y = 2x^2 - 2x + 1$$

$$y = x$$

Find the volume when the region bounded by the two curves is rotated around the **x-axis**

$$2x + y = 8$$

$$y = 8 + 2x - x^2$$

Find the volume when the region bounded by the two curves is rotated around the **y-axis**

$$2x + y = 8$$

$$y = 8 + 2x - x^2$$

Find the volume when the region bounded by the two curves is rotated around the line $x = -2$

$$2x + y = 8$$

$$y = 8 + 2x - x^2$$

Find the volume when the region bounded by the two curves is rotated around the line $y = 10$

$$2x + y = 8$$

$$y = 8 + 2x - x^2$$

A solid is formed by rotating the closed region between

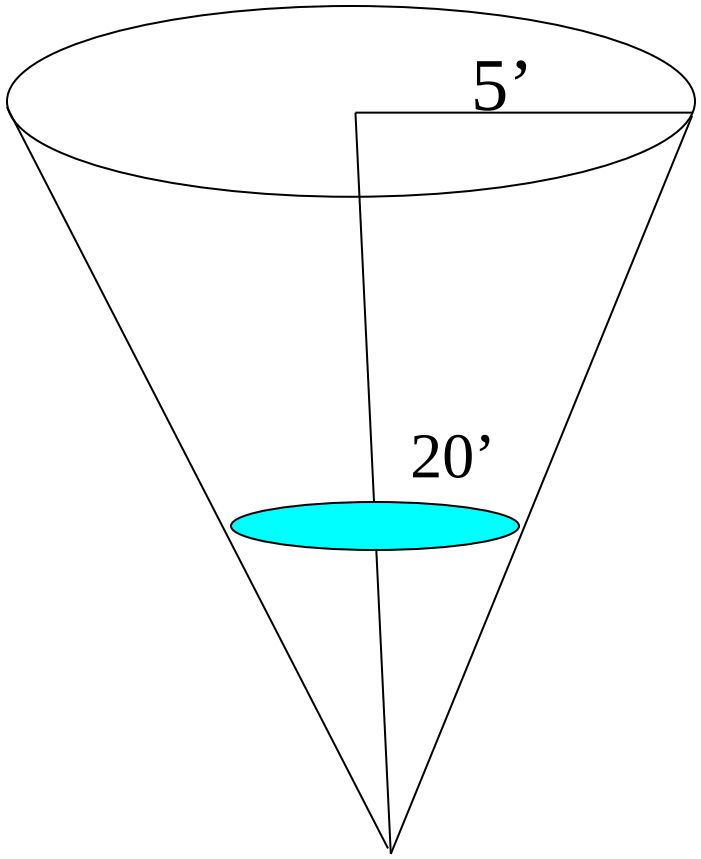
$4y - y^2 - 3 = x$ and $y = e^{-x}$

Around the line $y = -1$

Determine the volume of the solid

At rest, a spring has length 12 inches. 20 lbs. of force is required to compress the spring to a length of 10 inches. How much work is required to extend the spring from a length of 13 inches to a length of 16 inches?

How much work is required to pump all of the water out of the cone to a height of 10 feet above the cone? The density of water is 62.5 lbs per cubic foot.



A trust fund is set up to pay out $20,000 a year for fifteen years starting in ten years. Assume that 5% interest is available and that it is compounded continuously. Find the present value of the trust fund.

That means, how much money must be invested today so the payouts can occur as planned?

$$\int_{10}^{25} 20,000e^{-0.05t}\,dt \quad = \$128,010.34$$

Suppose you are going to pay $100 per month for 12 months.

You need $1200 over the next year.

Suppose you can get 5% interest. Then you need

$$\int_0^{12} 100e^{-\frac{0.05}{12}t}\,dt = \$1170.49$$

Boris just got some inheritance. He wants to make an investment so when he retires in 40 years he gets income from the investment. He estimates he will live 20 years after he retires and would like the investment to pay him $4000 per month for 20 years. He is assuming that he can get 5% interest for the next 60 years. What is the present value of Boris' retirement plan?

$$\int_{40}^{60} 12 \bullet 4000 \bullet e^{-.05t}\, dt = \$82,126.28$$

What if he only works for 30 years?

$$\int_{30}^{60} 12 \bullet 4000 \bullet e^{-.05t}\, dt = \$166,409.37$$

A professional athlete signed a contract that starts with $2,000,000 and increases continuously to $10,000,000 in eight years according to

$y = 8\sin\left(\frac{\pi}{16}t\right) + 2$ (million). Assume that a 4% interest rate is available, find the present value of the contract.

Solve $\dfrac{dy}{dx} = \sqrt{1 - y^2}$ if $y(1) = 0$