1.) Compute the arc length of the given curve on the indicated interval.
   a.) $y = x^{5/4}$ for $0 \le x \le 1$
   b.) $y = (1/6)x^3 + \frac{1}{2x}$ for $1 \le x \le 3$
   c.) $x = (1/8)y^4 + \frac{1}{4y^2}$ for $1 \le y \le 2$

2.) Consider the graph of $y = \sqrt{x}$ on the interval $0 \le x \le 1$. Compute the area of the surface of revolution formed by revolving this graph about the x-axis.

3.) Consider the graph of $x = (1/3)y^3$ on the interval $0 \le y \le 3$. Compute the area of the surface of revolution formed by revolving this graph about the y-axis.

4.) Consider the graph of $y = (2/3)x^{3/2}$ on the interval $1 \le x \le 9$. Compute the area of the surface of revolution formed by revolving this graph about the y-axis.

5.) Consider the graph of $y = (2x - x^2)^{1/2}$ on the interval $0 \le x \le 2$. Compute the area of the surface of revolution formed by revolving this graph about the x-axis.

6.) The graph of the equation $x^{2/3} + y^{2/3} = 1$ is revolved about the y-axis to form an astroid. Compute the surface area of the astroid.
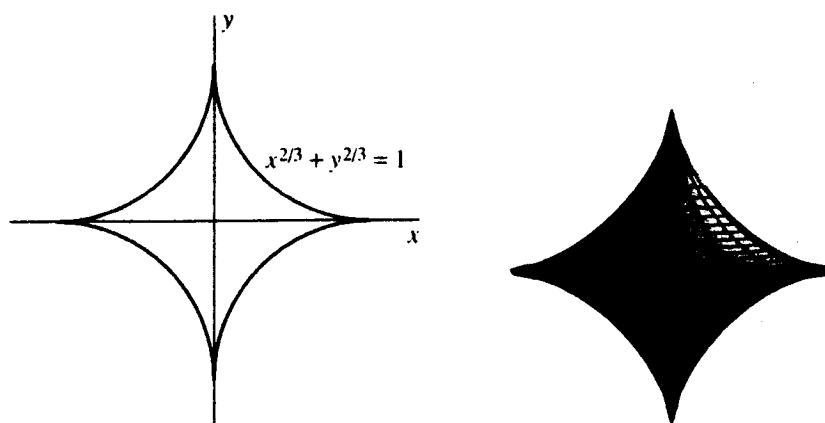
7.) How much work is required to raise a 500 pound weight to a point 50 feet above the graound using a rope weighing 2 pounds per foot ?

8.) (Hooke's Law) A spring is stretched 3 meters from it natural length by a force of 24 Newtons. If the force of the spring is proportional to the distance it is stretched, compute the work required to stretch the spring

a.) 2 meters from its natural length.

b.) from 3 meters to 5 meters from its natural length.

9.) (not Hooke's Law) The force required to stretch a spring x meters from its natural length is given by $F(x) = 2\sqrt{x}$ Newtons. How much work is done stretching the spring $1/2$ meter from its natural length ?

10.) A tank in the shape of a right circular cone (vertex down) of height 10 feet and radius 5 feet is filled with water which weighs 62.4 pounds per cubic feet. How much work is required to pump all of the water to a drain pipe 15 feet above the top of the tank ?

THE FOLLOWING PROBLEM IS FOR RECREATIONAL PURPOSES ONLY.

11.) Determine the exact value of the following expression : $\sqrt{1 + \sqrt{1 + \sqrt{1 + \sqrt{1 + \sqrt{1 + \ldots}}}}}$

Thanks to Dr. Kouba