Tutorial 1

Question 1

Find the area enclosed by the graphs of $f(x) = x^2$ and $g(x) = 2 - x^2, 0 \leq x \leq 2$.
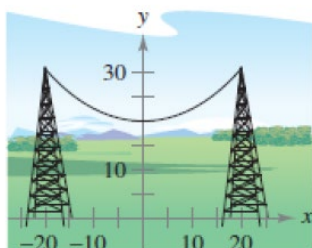
Question 2

Find the area enclosed by the graphs of $f(x) = x^3 - 2x^2$ and $g(x) = 2x^2 - 3x$.

Question 3

Find the area enclosed by the graphs of $x = y^2 + 2$ and $y = x - 8$

Question 4

Electrical wires suspended between two towers from a catenary (see figure) modeled by the equation $y = 10\left(e^{\frac{x}{20}} + e^{\frac{-x}{20}}\right), -20 \leq x \leq 20$

Where x and y are measured in meters. The two towers are 40 meters apart. Find the length of the suspended cable.

Question 5

Find the arc length of the graph of $f(x) = \frac{x^6 + 8}{16x^2}$ on the interval [2,3].

Question 6

Sketch the region bounded by $y = \sqrt{x}, y = 0,$ and $x = 9$, and use the disc method to find the volume of the solid generated by revolving the region about the line $x = 9$.

Question 7

Sketch the region bounded by $y = 9 - x^2$, $y = 2x + 6$, and use the disc method to find the volume of the solid generated by revolving the region about the x-axis.

Question 8

Find the volume of the solid formed by revolving the region bounded by $y = 2x + 1$, $x = 4$ and $y = 3$ about the line $x = -4$.

Question 9

Sketch the region bounded by the curve $y = 2\sqrt{x}$, the $x-$axis and the line $x = 4$, and use the disc method to find the volume obtained by rotating the region about the y-axis.

Question 10

Sketch the region bounded by the curves $y = 1 - x^2$ and $y = 0$, and use the method of cylindrical shells to find the volume obtained by rotating the region about the line $x = -1$.

Question 11

Sketch the region bounded by $y = x^2 - 4x + 6$, $y = x + 2$, and use the shell method to find the volume of the solid generated by revolving the region about the line $x = -1$.

Question 12

Sketch the region bounded by $y = x^3$, $y = 1$ and $x = 0$, and use the shell method to find the volume of the solid generated by revolving the region about the line $y = 1$.