

(* Quiz 44 | AP Calculus AB *)

(* Problem 1 *)

a) The region bounded by $y = 2 - \sin(x)$ and the horizontal axis on the interval $[0, \pi]$. The axis of revolution is horizontal axis. (Disk Method.) Sketch the region and label the axis of revolution.

b) Shell Method. The region is bounded by $x = 4 - y^2$ and $x = 0$. The rotational axis is $y = 6$. Sketch the region and label the axis of revolution.

(* Problem 2 *)

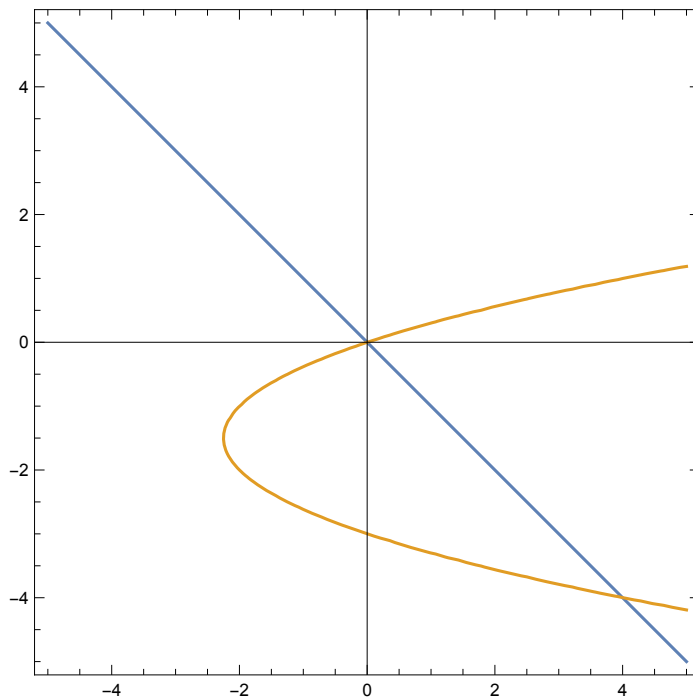
The typical cross section has hypotenuse $(2y)$. It's legs are both equal to m , so that $m^2 + m^2 = (2y)^2$. This turns into $m^2 = 2y^2$. The area of a typical cross section is $(\text{base} * \text{height}) / 2 = (m^2 / 2) = y^2$. Since the equation of the circle is $x^2 + y^2 = 9$, then $y^2 = 9 - x^2$. The volume of the given solid is given by :

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Integrate[9 - x^2, {x, -3, 3}]
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(* Problem 3 *)

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ContourPlot[{x + y == 0, x == y^2 + 3 y}, {x, -5, 5}, {y, -5, 5}, Axes -> True]
```



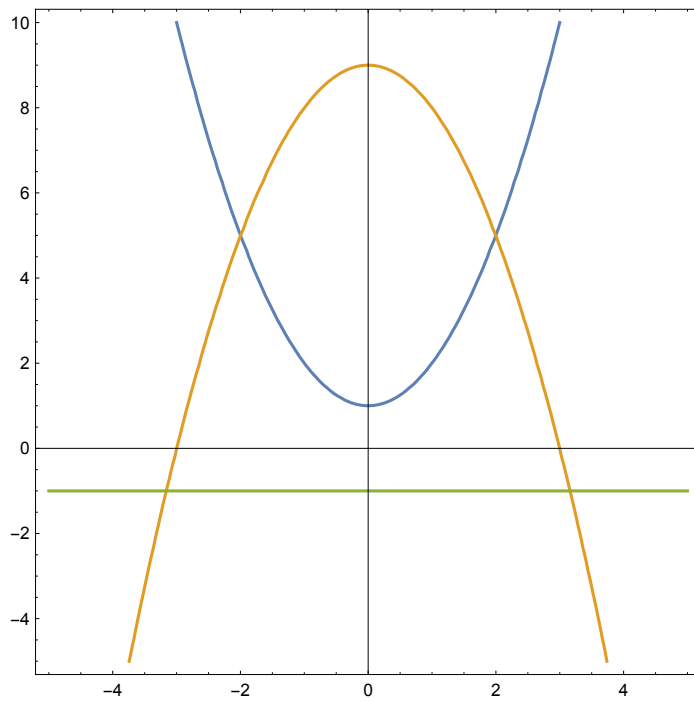
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Integrate[(-y) - (y^2 + 3 y), {y, -4, 0}]
```

32

3

(* Problem 4 *)

```
ContourPlot[{y == x^2 + 1, y == 9 - x^2, y == -1}, {x, -5, 5}, {y, -5, 10}, Axes → True]
```



```
In[3]:= VolumebyWasherMethod = Pi Integrate[(10 - x^2)^2 - (x^2 + 2)^2, {x, -2, 2}]
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Out[3]= 256 π
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