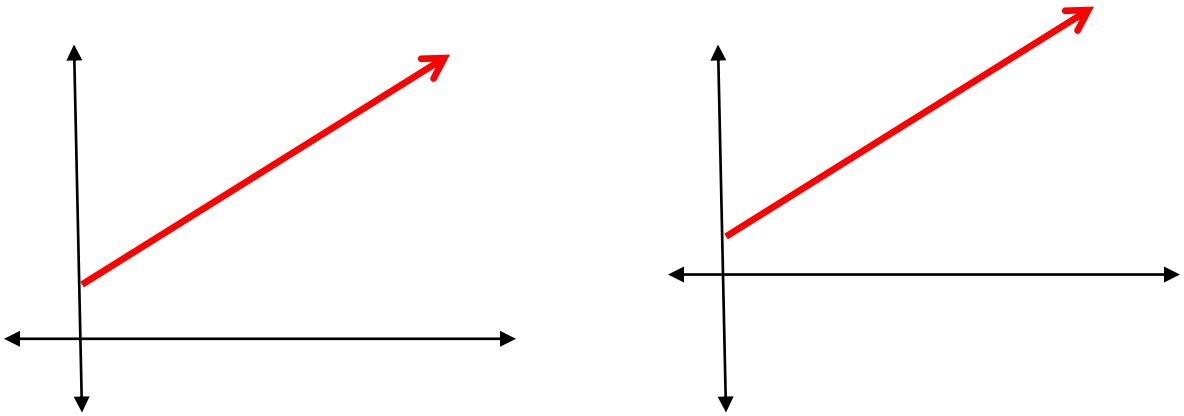
Unit 6: Volume of Solids
Revolution using Disks about the X-axis

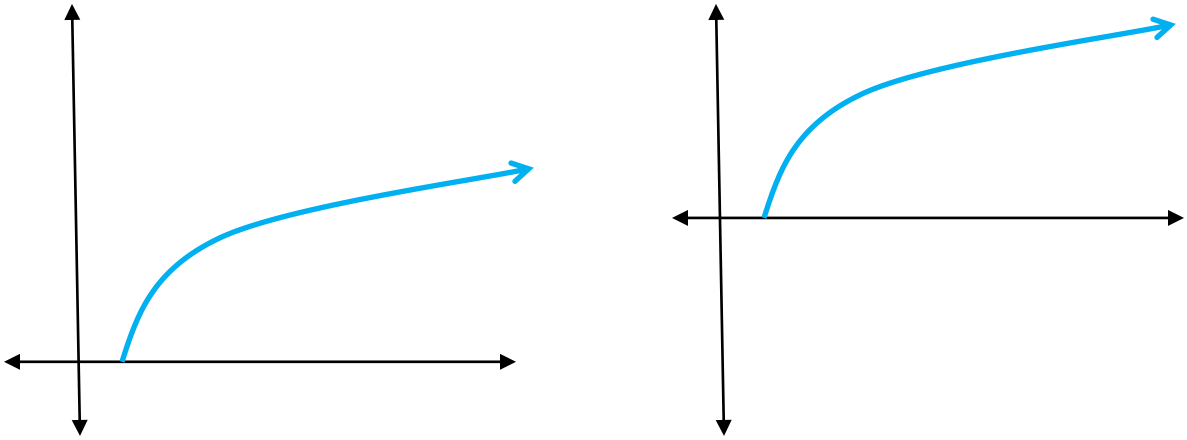
Name: _____

DISK METHOD

Example #1: Sketch the solid formed when the region: $y = x+1$, $x = 0$, $x = 5$, and $y = 0$ is rotated about the x-axis.



Example #2: Sketch the solid formed when the region: $y = \sqrt{x-1}$, $x = 9$, and $y = 0$ is rotated about the x-axis.



Volume = $\int_a^b \pi r^2 h$ $r = f(x)$ $h = dx$ *(NOTE: x=a and x=b)*

After substitution:

Volume = $\int_a^b \pi [f(x)]^2 dx$

(Ex # 1)

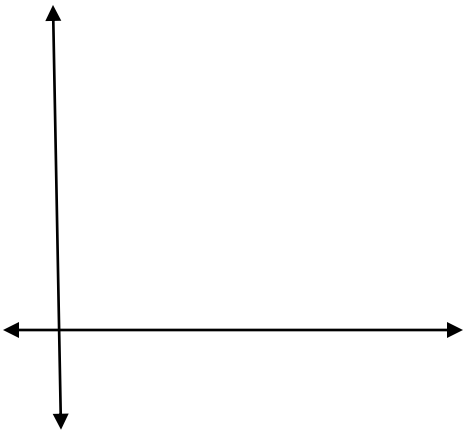
V =

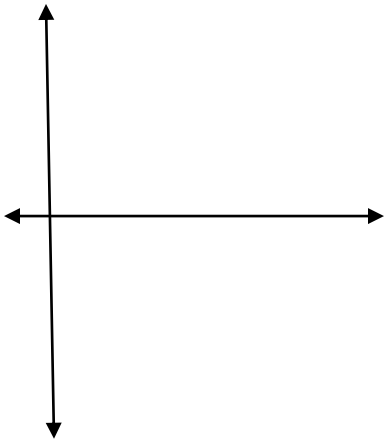
(Ex. #2)

V =

Examples:

1. Find the volume of the solid when the area enclosed by: $f(x) = 9 - 3x$, $x = 0$, and $y = 0$ is rotated about the x-axis.





Volume = $\int_a^b \pi r^2 h$ $r = f(x)$ $h = dx$

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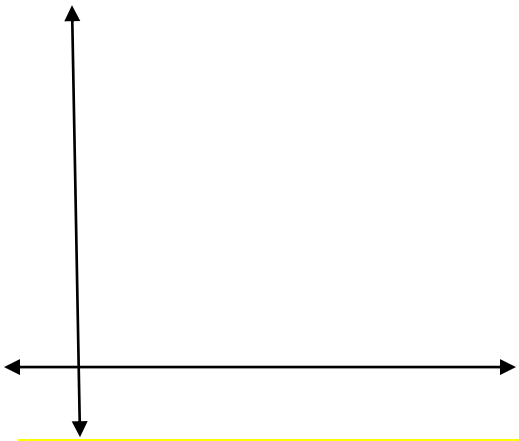
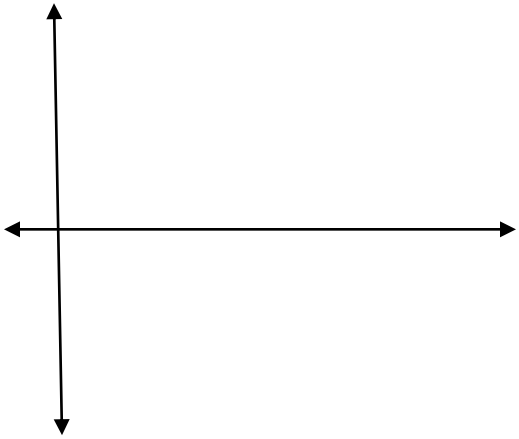
2. Find the volume of the solid formed when the area enclosed by: $g(x) = x^3 - 3x + 3$, $x=0$, $x = 3$, and $y = 0$ is rotated about the x-axis.





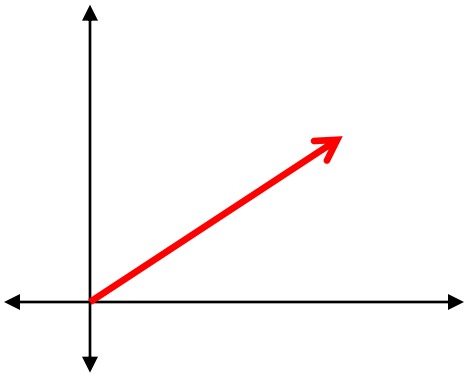
Volume = $\int_a^b \pi r^2 h$ $r = f(x)$ $h = dx$

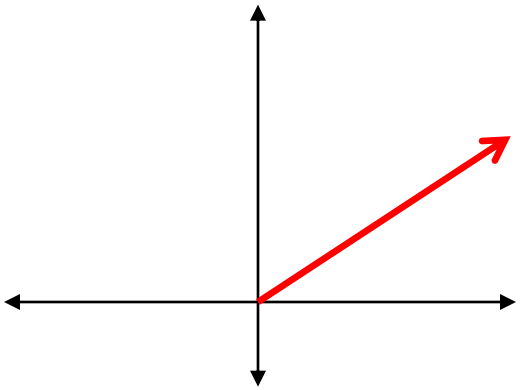
Unit 6: Volume of Solids
Revolution using Disks about the Y-axis

Name: _____

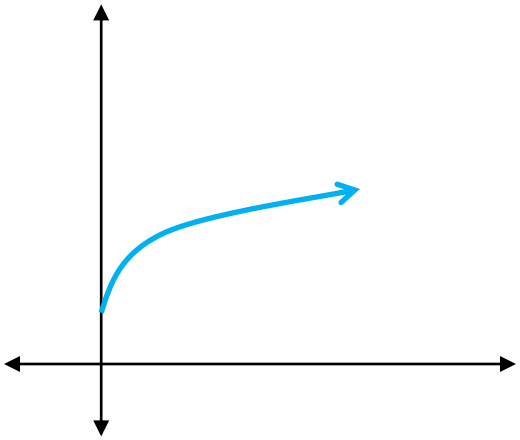
DISK METHOD

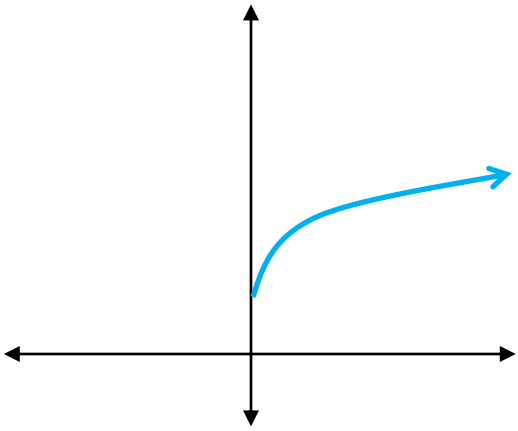
Example #1: Sketch the solid formed when the region: $y = x$, $x = 0$, $y = 0$, and $y = 5$ is rotated about the y-axis.





Example #2: Sketch the solid formed when the region: $y = \sqrt{x} + 1$, $x = 0$, and $y = 4$ is rotated about the y-axis.





Volume = $\int_a^b \pi r^2 h$ $r = f(y)$ $h = dy$ *(NOTE: y=a and y=b)*

After substitution:

Volume = $\int_a^b \pi [f(y)]^2 dy$

*The radius is represented by the function in x= form (in terms of y).

(Ex # 1)

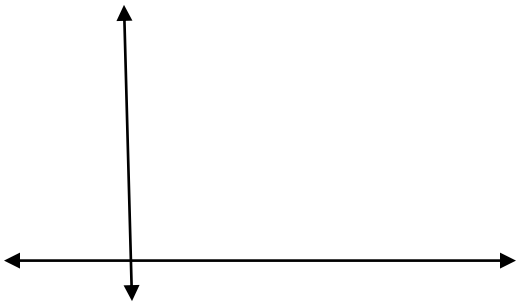
V =

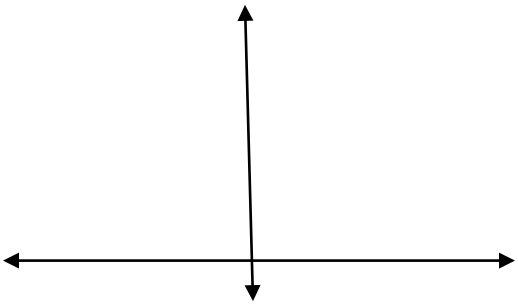
(Ex. #2)

V =

Examples:

1. Find the volume of the solid formed when the area enclosed by: $y = x^3$, $x = 0$, $y = 0$, and $y = 8$ is rotated about the y-axis.





Volume = $\int_a^b \pi r^2 h$ $f(y) = r$ $dy = h$

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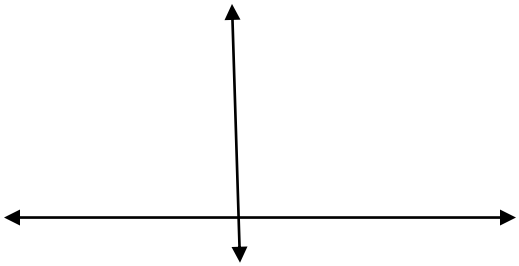
2. Find the volume of the solid formed when the area enclosed by: $x = y^2 + 3$, $x = 0$, $y = 0$, and $y = 3$ is rotated about the y-axis.



Volume = $\int_a^b \pi r^2 h$ $f(y) = r$ $dy = h$