

## THE SHELL METHOD - PART 2

Find the volume when the enclosed area is rotated about the given axis.

- $y = \frac{1}{2}x^2$ ,  $y = x$ 
  - y-axis
  - $x = -3$
- $f(x) = \sin(x^2 - 2x)$ ,  $g(x) = 4x - x^2$ 
  - y-axis
  - $x = 5$
- $f(x) = e^{\cos x}$ ,  $g(x) = x^3 - 2x^2 + 3x - 2$ ,  $x = 0$ 
  - y-axis
  - $x = -3$
  - $x = 5$

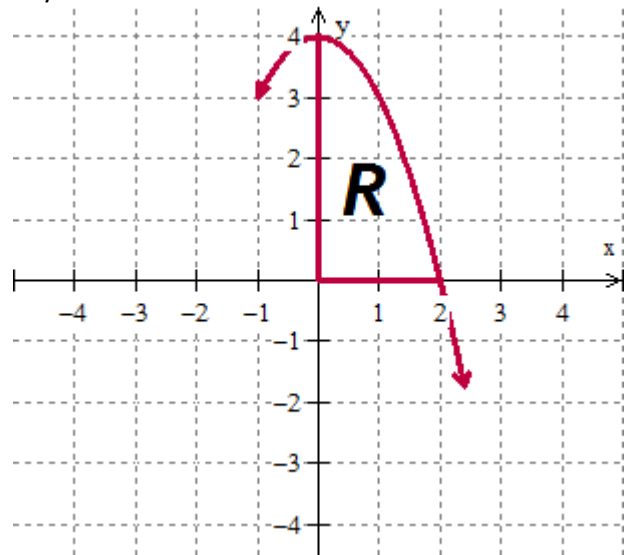
### AREA, SLICES, ROTATIONS REVIEW ALL IN ONE PROBLEM!

Use the **AREA R** in the FIRST quadrant enclosed by  $y = 4 - x^2$ , the x and y axis as shown.

- Find the area R.

Find the volume if R is rotated

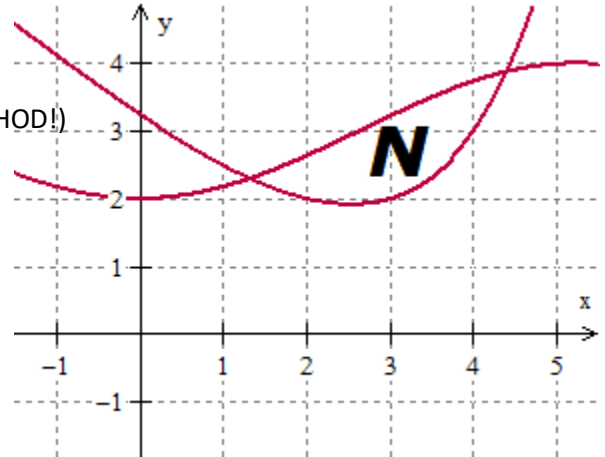
- Over the x-axis.
- Over the y-axis.
- Over the line  $x = 3$
- Over the line  $y = -2$
- SQUARE SLICES** are placed on R perpendicular to the x-axis
- SEMI-CIRCULAR SLICES** are placed on R perpendicular to the x-axis
- EQUILATERAL TRIANGLE SLICES** are placed on R perpendicular to the x-axis



Use the **AREA R** in the FIRST quadrant enclosed by  $f(x)=2^{x-2} - x + 3$  and  $g(x)=-\cos(.6x)+3$ .

12. Find the area R.

Find the volume if R is rotated (for over a vertical line, use the SHELL METHOD!)



13. Over the x-axis.

14. Over the y-axis.

15. Over the line  $x = 6$

16. Over the line  $y = 5$

17. Over the line  $y = -3$

18. Over the line  $x = -3$

19. **RIGHT ISOSOSCELES TRIANGLES SLICES** are placed on R perpendicular to the x-axis

20. **SEMI-CIRCULAR SLICES** are placed on R perpendicular to the x-axis

21. **RECTANGULAR SLICES OF HEIGHT 3** are placed on R perpendicular to the x-axis

**Answers**

1. -

a.  $\frac{4}{3}\pi$

b.  $\frac{16}{3}\pi$

2. -

a.  $43.818\pi$

b.  $71.486\pi$

3.

a.  $3.664\pi$

b.  $25.564\pi$

c.  $32.835\pi$

4.  $16/3$

5.  $17.067\pi$

6.  $8\pi$

7.  $24\pi$

8.  $38.4\pi$

9.  $17.067$

10.  $2.133\pi$

11.  $7.390$

12.  $2.480$

13.  $13.466\pi$

14.  $14.951\pi$

15.  $14.904\pi$

16.  $11.330\pi$

17.  $28.344\pi$

18.  $29.728\pi$

19.  $1.220$

20.  $0.305\pi$

21.  $7.439$