

Volumes: Disks (Not the Axis)

Numberbender | WORKSHEET



Name: _____ Date: _____ Score: _____

Find the volume of the solid formed by rotating the region around the given axis. Show all work.

Calculus 1 Worksheet #52

Finding volume rotated around something other than the axes (disks)

Find the volume of the solid that is generated by rotating about the indicated axis the region bounded by the given curves.

1. $y = \frac{1}{x}$, $y = 0$, $x = \frac{1}{10}$, $x = 1$ (x-axis)	2. $y = 9 - x^2$, $y = 0$ (x-axis)
3. $y = x^2$, $y = 8 - x^2$ (x-axis) (washer)	4. $y = x - x^3$, $y = 0$, 1st quadrant (x-axis)
5. $y = 6 - x^2$, $y = 2$ (y-axis)	6. $y = \sqrt{16 - x}$, $x = 0$, $y = 0$ (y-axis)
7.* $y = x^2 + 1$, $y = 5$ (around $y = 5$)	8.* $x = y^2$ and $x = 9$ (around $x = 9$).

Graph the region bounded by the given curves and then find its area.

9. $y = x^{1/3}$, $y = x^3$, 1st quadrant

10. $y = x^2$, $x = y^2$

11. If $k(x)$ is a continuous function and $\int_2^{10} k(x) dx = 5$ and $\int_{-1}^{10} k(x) dx = 14$ then find $\int_{-1}^2 k(x) dx$.

12. $\sum_{k=0}^5 (2k^2 + 3) =$

13. $\int 72x \, dx =$

14. Find the area bounded by $y = x^3 - 3x + 1$ and $y = 5x - 1$ (graph paper!)

15. If $f(x)$ is continuous on the interval $n \leq x \leq m$ and $n < p < m$, then $\int_p^m f(x) \, dx =$

(write your answer as a difference of integrals)

16. If c represents the number defined by Rolle's Theorem, then, for the function $f(x) = x^3 - 3x^2$ on the interval $[0, 3]$, $c =$

17. Find $\frac{dy}{dx}$ if $y = \sin^2 x$

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Answer key — for instructor use only.

Answers:

1. 9π	2. $\frac{1296\pi}{5}$	3. $\frac{512\pi}{3}$	4. $\frac{8\pi}{105}$	5. 8π
6. 128π	7. $\frac{512\pi}{15}$	8. $\frac{1296\pi}{5}$	9. $\frac{1}{2}$	10. $\frac{1}{3}$
11. 9	12. 128	13. $\frac{1}{2 \ln 7} 7^{2x} + C$	14. 32.753	15. $\int_n^m f(x) dx - \int_n^p f(x) dx$
16. 2	17. $\sin 2x$			