

Name:

# Math 2

## Practice Exam 2

1. Find the area enclosed by the curves  $x = y^2 - 4y$  and  $x = 2y - y^2$ .
2. Use calculus to find the area of the triangle with vertices  $(0, 0)$ ,  $(6, 3)$  and  $(0, 13)$ .
3. Use washers to find the volume of the solid obtained by rotating about the  $y$ -axis the region enclosed by  $y^2 = x$  and  $x = 2y$ .
4. Use washers to find the volume of the solid obtained by rotating about the  $x$ -axis the region enclosed by  $y = \frac{1}{x}$  and  $y = \frac{-1}{2}x + \frac{3}{2}$ .
5. Use disks to find the volume of the solid obtained by taking the region bounded by  $y = \sqrt{25 - x^2}$ ,  $x = 0$  and  $y = 0$  and (a) rotating it about the  $x$ -axis; (b) rotating it about the  $y$ -axis.

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6. Use cylindrical shells to find the volume of the solid obtained by rotating about the  $y$ -axis the region bounded by  $y = \sqrt{25 - x^2}$ ,  $x = 0$  and  $y = 0$ .

7. Set up, but do not evaluate, an integral for the volume obtained by rotating the region bounded by  $y = \ln(x)$ ,  $y = 0$  and  $x = 2$  about the  $y$ -axis.

8. Use any method to find the volume of the solid obtained by rotating the region bounded by  $y = 5$ ,  $y = x + \frac{4}{x}$  about the line  $x = -1$ .

9. If the work required to stretch a spring one foot beyond its natural length is 12 foot-pounds, how much work is needed to stretch it 9 inches beyond its natural length?

10. A spring has natural length 20 cm. Compare the work  $W_1$  done in stretching the spring from 20 cm to 30 cm with the work  $W_2$  done in stretching it from 30 cm to 40 cm. Find the relation between  $W_1$  and  $W_2$ .

11. Find the average value of the function  $h(x) = (3 - 2x)^{-1}$  on the interval  $[-1, 1]$ .

12. Find the average value of the function  $f(x) = \sqrt[3]{x}$  on the interval  $[1, 8]$ .
13. Find the average value of the function  $g(x) = \cos^4(x) \sin(x)$  on the interval  $[0, \pi]$ .
14. Let  $f(x) = (x - 3)^2$  on the interval  $[2, 5]$ . Find a value  $c$  such that  $f(c)$  is equal to the average value of  $f$  on the interval.