

MATH 3B WORKSHEET 7 ANSWER

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1. QUICK REVIEW

1. Draw a picture illustrating the volume of which we are evaluating by using cylindrical shells method, and write the formula of which you are going to use in order to evaluate the volume.

2. Compare disk model and shell method. In which condition you would use disk method? In which condition you would use shell method?

2. EXERCISES: FIND THE VOLUMES.

(1) The solid obtained by rotating the region bounded by $y = x(x - 1)^2$, $y = 0$ about the y -axis.

$$V = \int_0^1 2\pi x \cdot x(x - 1)^2 dx = \frac{\pi}{15}$$

(2) The solid obtained by rotating the region bounded by $x = 2\sqrt{y}$, $x = 0$, $y = 9$ about the y -axis.

$$V = \int_0^9 \pi(2\sqrt{y})^2 dy = 162\pi$$

(3) The solid obtained by rotating the region bounded by $y = x^3$, $y = 0$, $x = 1$, $x = 2$ about the y -axis.

$$V = \int_1^2 2\pi x \cdot x^3 dx = \frac{62\pi}{5}$$

- (4) The solid obtained by rotating the region bounded by $y = e^x$, $y = 0$, $x = -1$, $x = 2$ about x -axis.

$$V = \int_{-1}^2 \pi(e^x)^2 dx = \frac{\pi}{2}(e^4 - e^{-2})$$

- (5) The solid obtained by rotating the region bounded by $xy = 1$, $x = 0$, $y = 1$, $y = 3$ about x -axis.

$$V = \int_1^3 2\pi y \cdot \frac{1}{y} dy = 4\pi$$

- (6) *The solid obtained by rotating the region bounded by $y = 4x - x^2$, $y = 3$, about the line $x = 1$.

$$V = \int_1^3 2\pi(x - 1) \cdot (4x - x^2 - 3) dx = \frac{8\pi}{3}$$