Calculus 2 Workbook

Volume of revolution

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DISKS, HORIZONTAL AXIS

■ 1. Use disks to find the volume of the solid that's formed by rotating the region enclosed by the curves about the x-axis.

$$y = x^2 + 2x + 3$$

$$x = -3 \text{ and } x = 1$$

■ 2. Use disks to find the volume of the solid that's formed by rotating the region enclosed by the curves about the x-axis.

$$y = \sqrt{x - 1}$$

$$x = 1 \text{ and } x = 10$$

■ 3. Use disks to find the volume of the solid that's formed by rotating the region enclosed by the curves about the x-axis.

$$y = 2 \sec x$$

$$x = -\frac{\pi}{3} \text{ and } x = \frac{\pi}{3}$$

■ 4. Set up the integral that approximates the volume of the solid that's formed by rotating the region enclosed by the curves about the x-axis. Do not evaluate the integral.

$$y = \arctan x$$

$$x = 0 \text{ and } x = 5$$

■ 5. Use disks to find the volume of the solid that's formed by rotating the region enclosed by the curves about the x-axis.

$$y = \sqrt{25 - x^2}$$

$$x = -4 \text{ and } x = 4$$

DISKS, VERTICAL AXIS

■ 1. Use disks to find the volume of the solid that's formed by rotating the region enclosed by the curves about the y-axis.

$$x = \frac{1}{6}y - 2 \text{ and } x = 0$$

$$y = 1 \text{ and } y = 6$$

■ 2. Use disks to find the volume of the solid that's formed by rotating the region enclosed by the curves about the y-axis.

$$x = \frac{3}{7}\sqrt{y} + 2 \text{ and } x = 0$$

$$y = 2 \text{ and } y = 5$$

■ 3. Use disks to find the volume of the solid that's formed by rotating the region enclosed by the curves about the y-axis.

$$x = y^2 + 1 \text{ and } x = 0$$

$$y = -2 \text{ and } y = 2$$

4. Use disks to find the volume of the solid that's formed by rotating the region enclosed by the curves about the y-axis. Set up the integral, but do not evaluate it.

$$x = \sin y$$

$y = 0$ and $y = \pi$

DISKS, VOLUME OF THE FRUSTUM

1. Use disks to find the volume of the frustum of a right circular cone with height $h = 18$ inches, a lower base radius $R = 9$ inches, and an upper radius of $r = 6$ inches.

2. Use disks to find the volume of the frustum of a right circular cone with height $h = 16$ inches, a lower base radius $R = 12$ inches, and an upper radius of $r = 9$ inches.

3. Use disks to find the volume of the frustum of a right circular cone with height $h = 7$ inches, a lower base radius $R = 8\sqrt{3}$ inches, and an upper radius of $r = \sqrt{3}$ inches.

WASHERS, HORIZONTAL AXIS

■ 1. Use washers to find the volume of the solid that's formed by rotating the region enclosed by the curves about the x-axis.

$y = x^{\frac{2}{3}}$ and $y = 4$

$x = 0$ and $x = 8$

■ 2. Use washers to find the volume of the solid that's formed by rotating the region enclosed by the curves about the x-axis.

$y = x^2$ and $y = \sqrt{x}$

■ 3. Use washers to find the volume of the solid that's formed by rotating the region enclosed by the curves about the x-axis.

$y = x^2$ and $y = x^3$

WASHERS, VERTICAL AXIS

■ 1. Use washers to find the volume of the solid that's formed by rotating the region enclosed by the curves about the y-axis.

$x = y^2 - 4y + 6$ and $x = 6$

$y = 2$ and $y = 4$

■ 2. Use washers to find the volume of the solid that's formed by rotating the region enclosed by the curves about the y-axis.

$x = 12(y^2 - y^3) + 2$ and $x = 2$

$y = 0$ and $y = 1$

■ 3. Use washers to find the volume of the solid that's formed by rotating the region enclosed by the curves about the y-axis.

$x = \frac{y^4}{4} - \frac{y^2}{2} + 2$ and $x = \frac{y^2}{2} + 2$

$y = -2$ and $y = 2$

CYLINDRICAL SHELLS, HORIZONTAL AXIS

■ 1. Use cylindrical shells to find the volume of the solid that's formed by rotating the region enclosed by the curves about the x-axis.

$$x = \left(\frac{y}{2}\right)^2 \text{ and } x = 4$$

$$y = 0$$

■ 2. Use cylindrical shells to find the volume of the solid that's formed by rotating the region enclosed by the curves about the x-axis.

$$x = \frac{y}{3} \text{ and } x = \sqrt{y}$$

■ 3. Use cylindrical shells to find the volume of the solid that's formed by rotating the region enclosed by the curves about the x-axis.

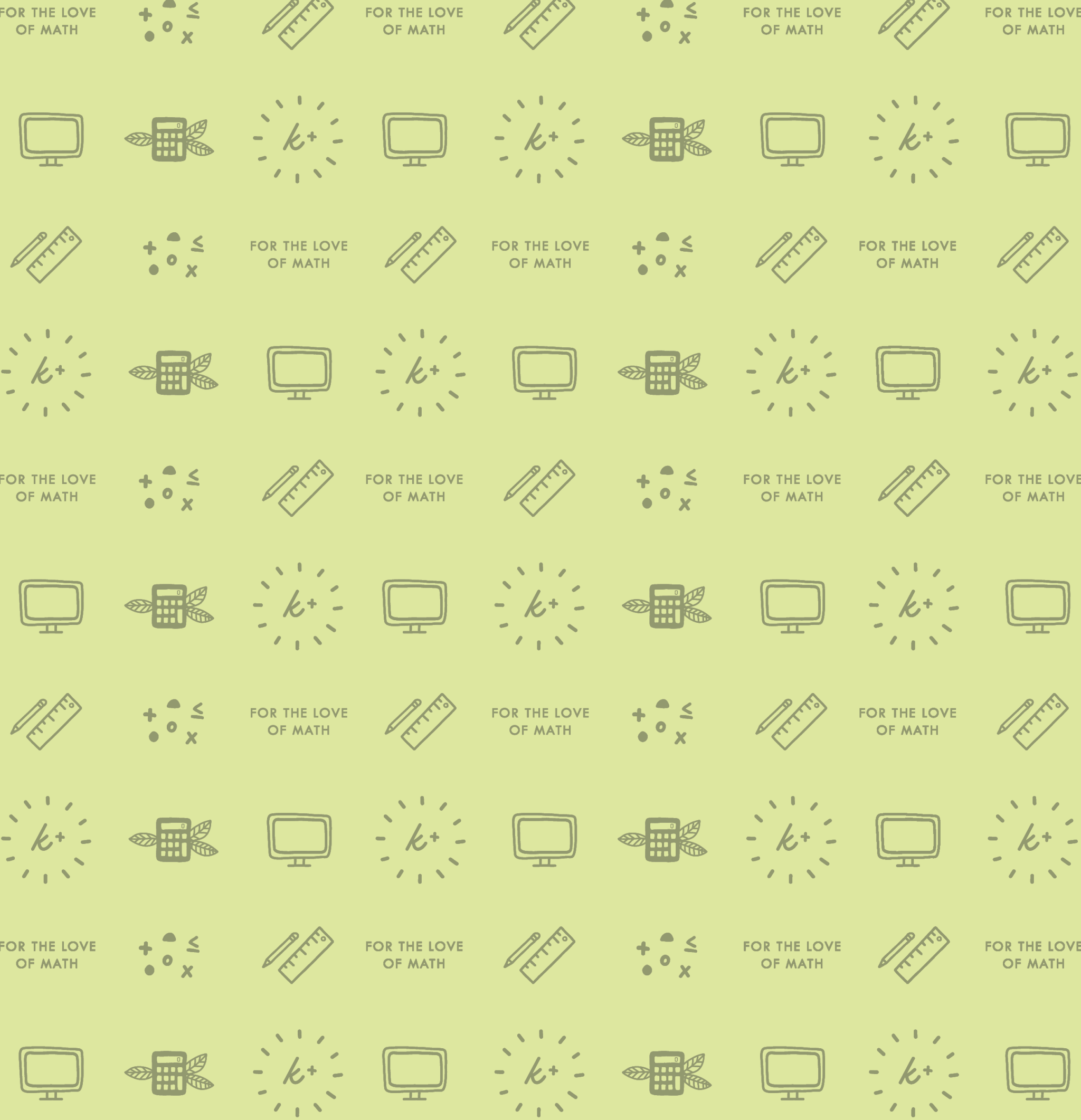
$$x = \sqrt[3]{\frac{y}{3}} \text{ and } x = \sqrt{\frac{y}{6}}$$

$$y = 3$$

4. Use cylindrical shells to find the volume of the solid that's formed by rotating the region enclosed by the curves about the x-axis.

$$x = 4 - \sqrt{y} \text{ and } x = 2 - \sqrt{\frac{y}{6}}$$

$$y = 0 \text{ and } y = 3$$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