2/16/11

- warm up using arc length example from 7.4 worksheet
- Review

Friday & Monday

NO SCHOOL

Next Wednesday

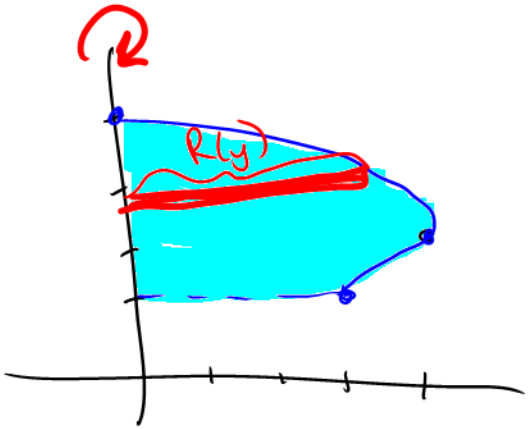
Exam 2/ 7.1-7.4

HW 7.1-7.4 is due

Today's office hours are cancelled ↳ Tuesday office hours are 2-3:30 in room 320D

7.2

(10)



$x = -y^2 + 4y$

$R(y) = (-y^2 + 4y) - (0)$

$R(y) = -y^2 + 4y$

$$V = \pi \int_1^4 (-y^2 + 4y)^2 \, dy$$

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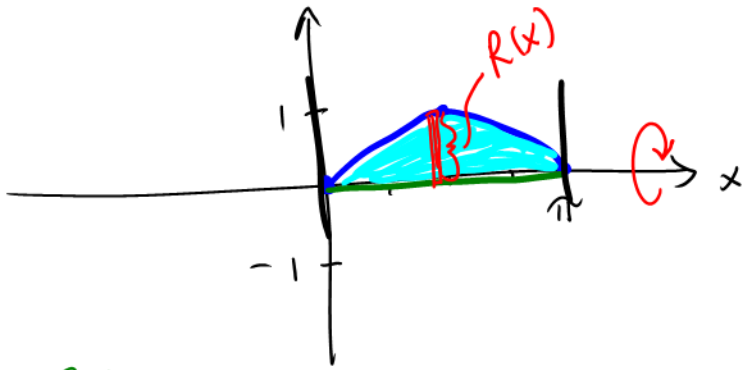
(33) $y = \sin x$, $y = 0$, $x = 0$, $x = \pi$



$R(x) = (\sin x) - (0) = \sin x$

$$V = \pi \int_0^{\pi} \sin^2 x \, dx$$

$$V = \pi \int_0^{\pi} \frac{1 - \cos 2x}{2} \, dx$$

$u = 2x$

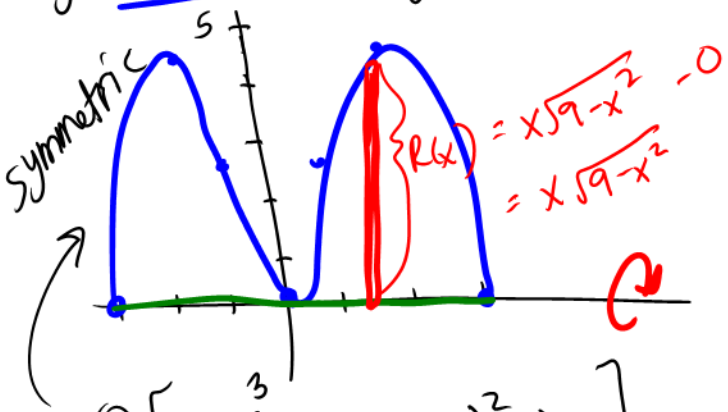
$\frac{du}{dx} = 2 \rightarrow dx = \frac{du}{2}$

$$V = \frac{\pi}{2} \left[x - \frac{\sin 2x}{2} \right|_0^{\pi}$$

$$V = \frac{\pi}{2} \left[(\pi - 0) - (0 - 0) \right]$$

$$V = \frac{\pi^2}{2} \text{ units}^3$$

(24) $y = x\sqrt{9-x^2}$, $y = 0$



$x\sqrt{9-x^2} = 0$

$x = 0$ or $\left(\sqrt{9-x^2}\right)^2 = (0)^2$

$9 - x^2 = 0$

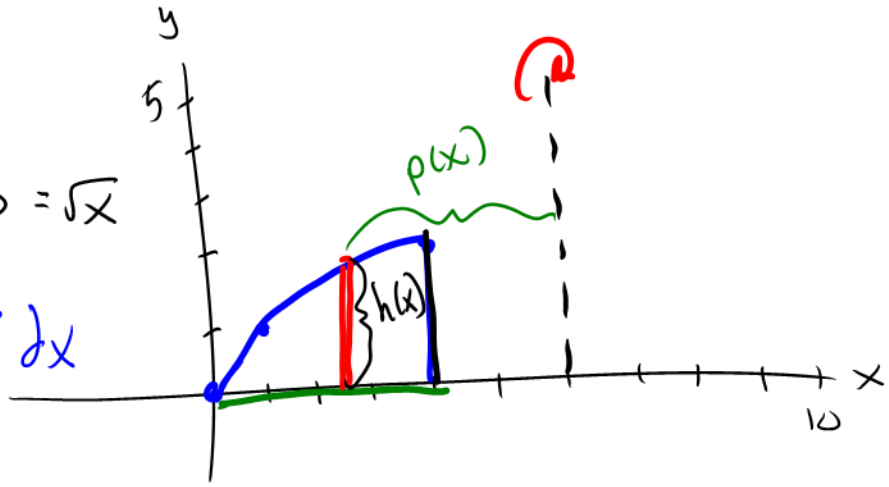
$x = \pm 3$

$$V = 2\left[\pi \int_0^3 \left(x\sqrt{9-x^2}\right)^2 dx\right]$$

$$V = 2\pi \int_0^3 x^2(9-x^2)\,dx$$

7.3

(24) $y = \sqrt{x}$, $y = 0$, $x = 4$, about the line $x = 6$

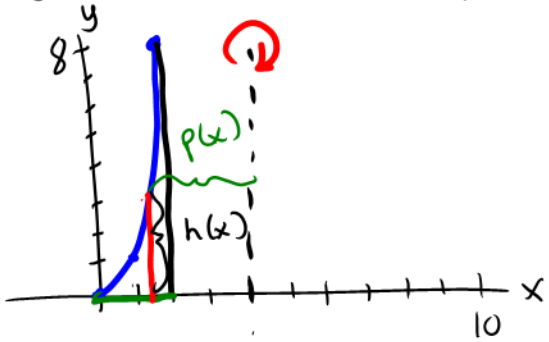


$p(x) = 6 - x$

$h(x) = \sqrt{x} - 0 = \sqrt{x}$

$$V = 2\pi \int_0^4 (6-x)\sqrt{x}\,dx$$

(29c) $y = x^3$, $y = 0$, $x = 2$, about $x = 4$

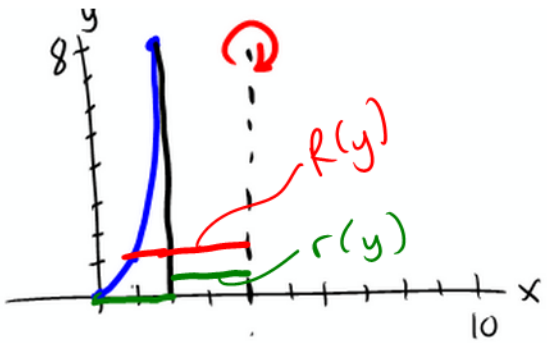


Shell

$p(x) = 4 - x$

$h(x) = x^3 - 0 = x^3$

$$V = 2\pi \int_0^2 (4-x)(x^3)\,dx$$



$y = x^3 \rightarrow x = \sqrt[3]{y} = y^{1/3}$

$R(y) = 4 - y^{1/3}$

$r(y) = 4 - 2 = 2$

$$V = \pi \int_0^8 \left[(4 - y^{1/3})^2 - (2)^2 \right] dy$$

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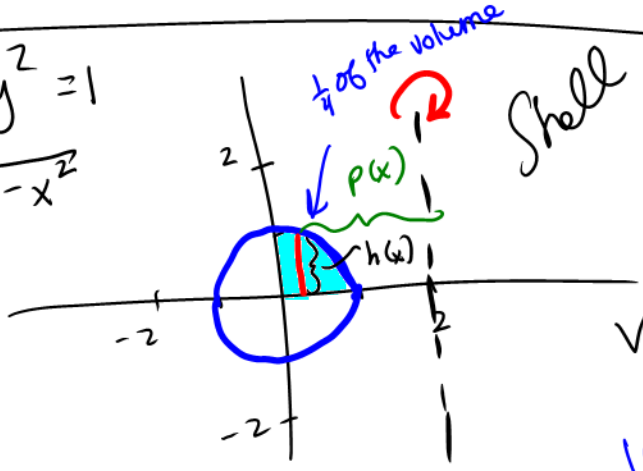
(47) $x^2 + y^2 = 1$

$y = \pm\sqrt{1 - x^2}$

$y = \sqrt{1 - x^2}$



Shell

$p(x) = 2 - x$

$h(x) = \sqrt{1 - x^2} - 0 = \sqrt{1 - x^2}$

$$V = 4\left[2\pi \int_0^1 (2 - x)(1 - x^2)^{1/2} \, dx \right]$$

$$V = 8\pi \left[\int_0^1 2\sqrt{1 - x^2} \, dx \right]$$ this is 2x Area of quarter circle

$$-\frac{1}{2}\int_0^1 2x(1 - x^2)^{1/2} \, dx \Big]$$

$$V = 8\pi \left[\left(\frac{\pi (1)^2}{2} \right) - \frac{1}{2}\left(\frac{2}{3}(1 - x^2)^{3/2} \Big|_0^1 \right) \right]$$

$$V = 8\pi \left(\frac{\pi}{2} - \frac{1}{3}(0 - 1) \right]$$

$$V = 8\pi \left(\frac{\pi}{2} + \frac{1}{3} \right)$$

$$V = \frac{4}{8\pi}\left(\frac{3\pi + 2}{3} \right)$$

$$\boxed{V = \frac{4\pi}{3}(3\pi + 2)}$$

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(41) $2\pi \int_0^2 y\left[5 - (y^2 + 1) \right] dy$