Click a question to preview it. Expand a question to view student scores.

Talking: Richard Port

Questions	First assignment attempt	Last assignment attempt	
Example 2 - 5.4 Example 2	83.33%	83.33%	83.33%
Sec. Ex. 6 - 5.4 Section Exercise 6	33.33%	66.67%	66.67%
Sec. Ex. 13 - 5.4 Section Exercise 13	50.00%	66.67%	66.67%
Sec. Ex. 33 - 5.4 Section Exercise 33	50.00%	66.67%	66.67%
Sec. Ex. 35 - 5.4 Section Exercise 35	33.33%	66.67%	66.67%
Sec. Ex. 6 - 6.1 Section Exercise 6	50.00%	66.67%	66.67%
Sec. Ex. 17 - 6.1 Section Exercise 17	33.33%	33.33%	33.33%
Sec. Ex. 37 - 6.1 Section Exercise 37	33.33%	50.00%	50.00%
Sec. Ex. 52 - 6.2 Section Exercise 52	33.33%	66.67%	66.67%
Sec. Ex. 61 - 6.2 Section Exercise 61	0.00%	50.00%	50.00%

Evaluate the given integral.

$$\int e^{3-15x}\,dx$$

$=$ □

$u = 3 - 15x$

$du = -15\,dx$

$\frac{du}{-15} = dx$

$$\int e^{u} \cdot \frac{du}{-15} = \frac{e^{u}}{-15} + C$$

$$\frac{e^{3-15x}}{-15} + C$$

$$(-1/15)e^{3-15x} + C$$

Evaluate the given integral.

$$\int_7^8 x\sqrt{x-7}\,dx$$

$u = x-7$

$du = dx$

$x = u+7$

$u = x-7$

$u(7) = 0$

$u(8) = 1$

$$\int_0^1 (u+7)\sqrt{u}\,du$$

$$= \int_0^1 u^{3/2} + 7u^{1/2}\,du$$

$$= \frac{u^{5/2}}{5/2} + \frac{7u^{3/2}}{3/2}\Big|_0^1$$

$$= \frac{2}{5} + \frac{14}{3} = \frac{76}{15}$$

10. Award: 10.00 points Problems?

Evaluate $\int x^3 e^{-5x}\,dx$.

$u = x^3$ $dv = e^{-5x}$

$3x^2$ $-\frac{1}{5}e^{-5x}$

$6x$ $\frac{1}{25}e^{-5x}$

6 $-\frac{1}{125}e^{-5x}$

$\frac{1}{625}e^{-5x}$

$$\left(-\frac{1}{5}x^3 - \frac{3}{25}x^2 - \frac{6}{125}x - \frac{6}{625}\right)e^{-5x} + C$$

5. Award: 10.00 points Problems? Adjust credit for all students.

Question

Set up the integral for the surface area of the surface of revolution and approximate the integral with a numerical method. Round your answer to three decimal places.

$y = 2\sin x$, $0 \le x \le \pi/4$, revolved about the x-axis

$S \approx$ ☐

$$\int_0^{\pi/4} 2\pi (2\sin x)\sqrt{1+(2\cos x)^2}\,dx$$

$= \#$

6. Award: 10.00 points Problems? Adjust credi

Evaluate $\int \sec 2x \tan 2x \, dx$.

$u = 2x$

$du = 2\,dx$

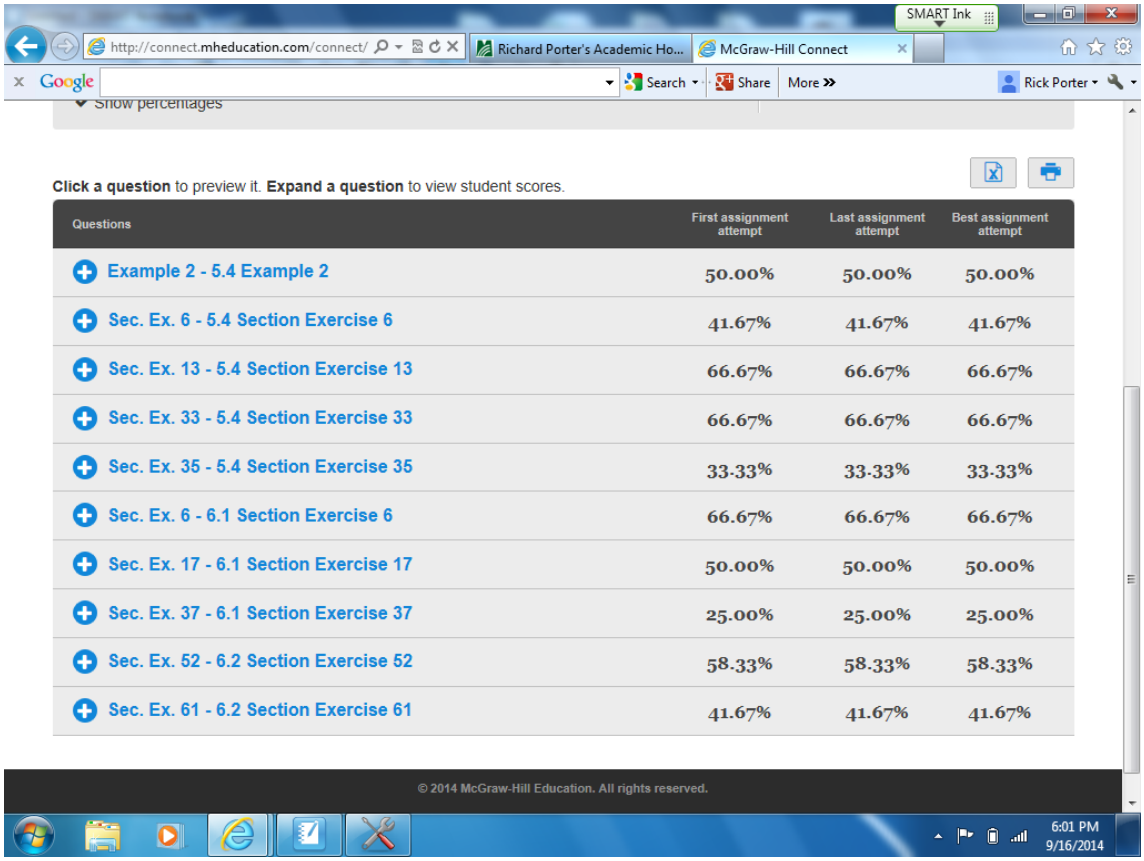
$\frac{du}{2} = dx$

$\int \sec u \tan u \frac{du}{2}$

$\frac{\sec u}{2} + C$

$\frac{\sec(2x)}{2} + C$

☐ $= \square + C$



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Questions	First assignment attempt	Last assignment attempt	Best assignment attempt
Example 2 - 5.4 Example 2	50.00%	50.00%	50.00%
Sec. Ex. 6 - 5.4 Section Exercise 6	41.67%	41.67%	41.67%
Sec. Ex. 13 - 5.4 Section Exercise 13	66.67%	66.67%	66.67%
Sec. Ex. 33 - 5.4 Section Exercise 33	66.67%	66.67%	66.67%
Sec. Ex. 35 - 5.4 Section Exercise 35	33.33%	33.33%	33.33%
Sec. Ex. 6 - 6.1 Section Exercise 6	66.67%	66.67%	66.67%
Sec. Ex. 17 - 6.1 Section Exercise 17	50.00%	50.00%	50.00%
Sec. Ex. 37 - 6.1 Section Exercise 37	25.00%	25.00%	25.00%
Sec. Ex. 52 - 6.2 Section Exercise 52	58.33%	58.33%	58.33%
Sec. Ex. 61 - 6.2 Section Exercise 61	41.67%	41.67%	41.67%

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$$\int_4^5 x\sqrt{x-4}\,dx$$

$u = x-4$

$du = 1dx$

$x=4$

$x=5$

$x = u+4$

$u^{1/2}$

Jenna

$$\int_0^1 (u+4)\sqrt{u}\,du$$

$$\int_0^1 u^{3/2} + 4u^{1/2}\,du$$

$$\frac{2}{5}u^{5/2} + 4\frac{2}{3}u^{3/2}\Big|_0^1$$

$\frac{2}{5} + \frac{8}{3}$

$\frac{46}{15}$

Set up the integral for the surface area of the surface of revolution and approximate the integral with a numerical method. Round your answer to three decimal places.

$y = 2\sin x,\ 0 \le x \le \pi/4$, revolved about the x−axis

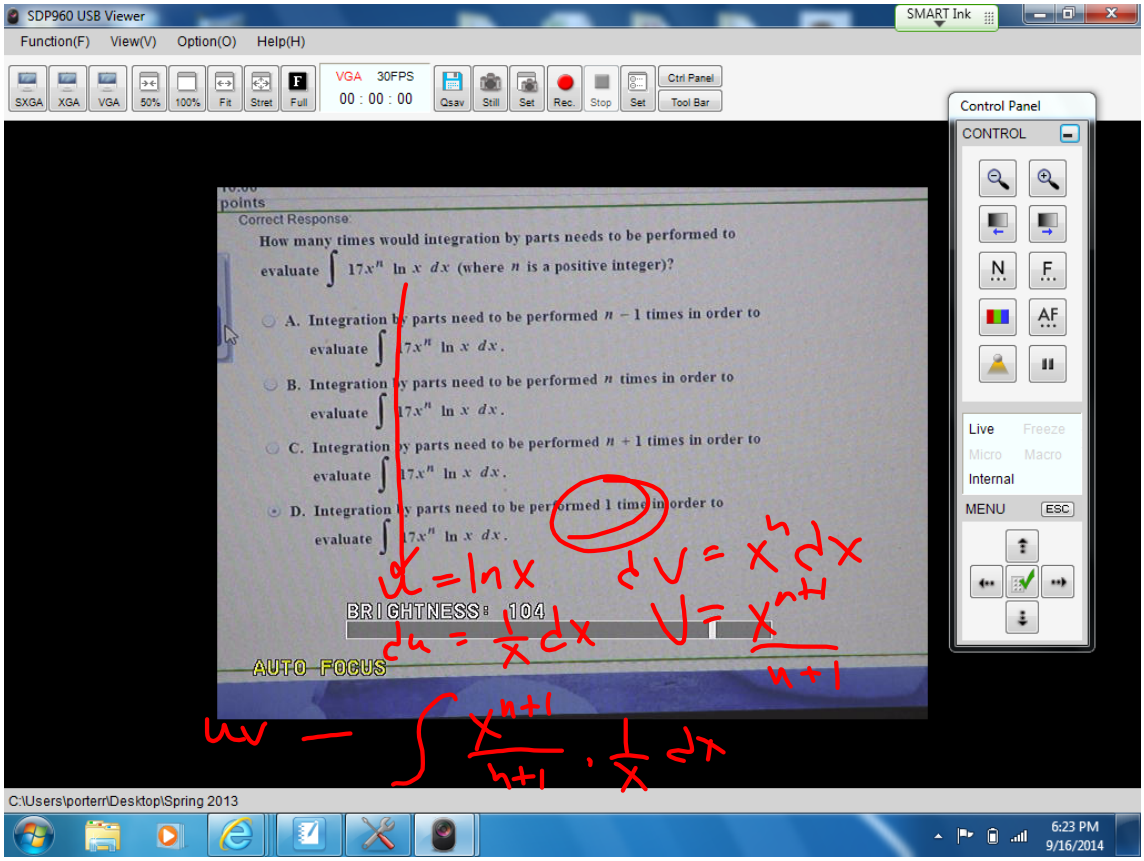
Using the surface area formula,

$$S = \int_a^b 2\pi f(x)\sqrt{1 + [f'(x)]^2}\,dx,$$

we have

$$S = \int_0^{\pi/4} (2\pi)(2\sin x)\sqrt{1 + (2\cos x)^2}\,dx \approx 7.289$$

where we have used a numerical method to approximate the value of the integral.



Evaluate $\int 9x^3 e^{-5x} \, dx.$

$\square + C$

$+ 9x^3 \quad e^{-5x}$

$- 27x^2 \quad \frac{e^{-5x}}{-5}$

$+ 54x \quad \frac{e^{-5x}}{25}$

$- 54 \quad \frac{e^{-5x}}{-125}$

$\frac{e^{-5x}}{625}$ kathleen

$-\frac{9x^3}{5}e^{-5x} - \frac{27x^2}{25}e^{-5x} - \frac{54x}{125}e^{-5x} - \frac{54}{625}e^{-5x}$

Evaluate the integral $\int 17\cos^2 x \, dx$.

$\cos(a+b)=\cos a\cos b-\sin a\sin b$

$\cos(2x)=\cos^2x-\sin^2x$

$\cos(2x)=\cos^2x-(1-\cos^2x)$

$\cos(2x)=2\cos^2x-1$

$\cos^2x=(1+\cos(2x))/2$

$\sin^2x=(1-\cos(2x))/2$

know these

$17\int \frac{1}{2}+\frac{\cos(2x)}{2}dx$

$\frac{17}{2}x+\frac{17}{2}\int\cos(2x)dx$

$\frac{17}{2}x+\frac{17}{2}\left[\frac{\sin(2x)}{2}\right]+C$

$\frac{17}{2}x+\frac{17}{4}\sin(2x)+C$

Trig Substitution

$\cos(a+b)=\cos a\cos b-\sin a\sin b$

$\cos(a+a)$

$\cos(2a)=\cos^2a-\sin^2a$

$=1-\sin^2a-\sin^2a$

$\cos(2a)=1-2\sin^2a$

$\int\frac{1-\cos(2a)}{2}da=\int\sin^2a\,da$

$\int\frac{1}{2}da-\frac{1}{2}\int\cos(2a)da$

$\frac{1}{2}a-\frac{1}{2}\frac{\sin(2a)}{2}$

Let $u = \cos x$, $du = -\sin x\ dx$.

$$\int_{-\pi/3}^{0} 21\sqrt{\cos x}\sin^3 x\ dx$$

$\sin^2 x\ (\sin x dx)$

$x = -\pi/3 \Rightarrow u = 1/2$

$x = 0 \Rightarrow u = 1$

$$= 21\int_{-\pi/3}^{0} \sqrt{\cos x}\left(1-\cos^2 x\right)\sin x\ dx$$

$$= 21\int_{1/2}^{1} \sqrt{u}\left(1-u^2\right)(-du)$$

$$= 21\int_{1/2}^{1} \left(u^{5/2}-u^{1/2}\right)du$$

$$= 21\left(\frac{2}{7}u^{7/2}-\frac{2}{3}u^{3/2}\right)\Bigg|_{1/2}^{1}$$

$$= \frac{25}{8}\sqrt{2}-8$$

$$2\int x^3\sqrt{x^2+52}\ dx$$

$x^2+52=u \quad x^2=u-52$

$2x\,dx=du$

$$\int 2x\cdot x^2\sqrt{x^2+52}\,dx$$

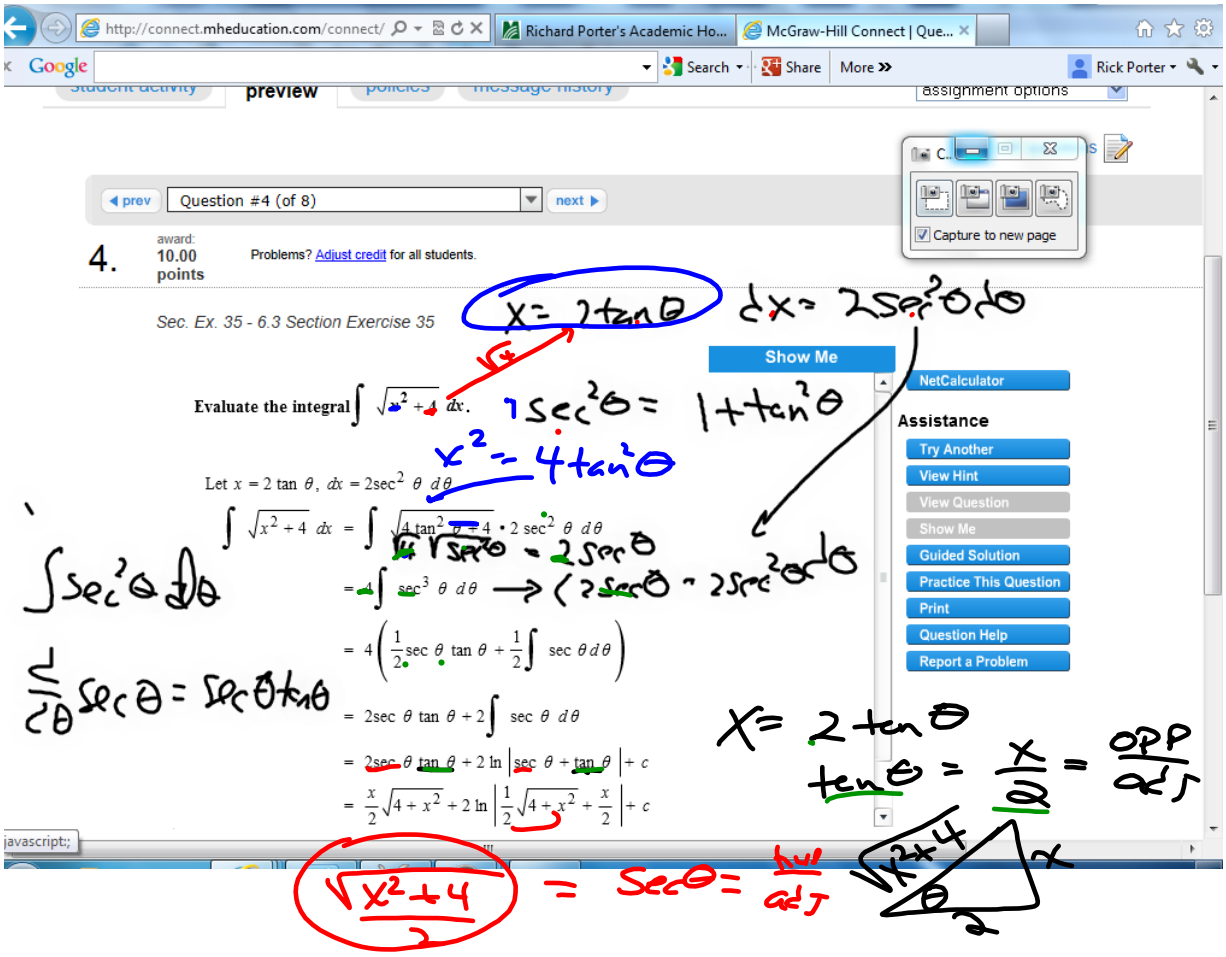
$$\int (u-52)u^{\frac{1}{2}}du$$

$$=\int u^{\frac{3}{2}}-52u^{\frac{1}{2}}du$$

$$=\frac{2}{5}u^{\frac{5}{2}}-\frac{104}{3}u^{\frac{3}{2}}+C$$

$$=\frac{2}{5}(x^2+52)^{\frac{5}{2}}-\frac{104}{3}(x^2+52)^{\frac{3}{2}}+C$$

Jun



$\int \sec^3\theta\,d\theta$

$u = \sec\theta \quad dv = \sec^2\theta\,d\theta$

$du = \sec\theta\tan\theta \quad v = \tan\theta$

$\int \sec^3\theta = \sec\theta\tan\theta - \int \sec\theta\tan^2\theta\,d\theta$

$= \sec\theta\tan\theta - \int \sec\theta(\sec^2\theta - 1)\,d\theta$

$= \sec\theta\tan\theta - \int \sec^3\theta - \sec\theta\,d\theta$

$\int \sec^3\theta\,d\theta = \sec\theta\tan\theta - \int \sec^3\theta\,d\theta + \int \sec\theta\,d\theta$

$2\int \sec^3\theta\,d\theta = \sec\theta\tan\theta + \int \sec\theta\,d\theta$

$\int \sec^3\theta\,d\theta = \frac{1}{2}\sec\theta\tan\theta + \frac{1}{2}\int \sec\theta\,d\theta$

$$\int \sec^3 x \, dx$$

$$\int \sec x \cdot \sec^2 x \, dx$$

$$\int \sec x \left(1 + \tan^2 x\right) dx$$

$$\int \sec x \, dx + \int \tan^2 x \sec x \, dx$$

$u = \tan x \quad du =$

$$\int \sec^3 \theta \, d\theta$$

$$\int \sec\theta \left(\sec^2 \theta\right) d\theta$$

$$\int \sec\theta \left(1 + \tan^2 \theta\right) d\theta$$

$$\int \sec\theta \, d\theta + \int \tan^2 \theta \sec\theta \, d\theta$$

$$\int \sec\theta \cdot \frac{\sec\theta + \tan\theta}{\sec\theta + \tan\theta}\, d\theta$$

$$\int \frac{\sec^2\theta + \sec\theta\tan\theta}{\tan\theta + \sec\theta}\, d\theta$$

$u = \tan\theta + \sec\theta$

$du = (\sec^2\theta + \sec\theta\tan\theta)\, d\theta$

$$\int \frac{1}{u}\, du = \ln|u| + C$$

$$\ln|\tan\theta + \sec\theta| + C$$

$$\int \sqrt{x^2+4}\, dx$$

$a^2 + b^2$

↓

$\tan x$

$\frac{d}{dx}\ \sin^{-1}(x)$

$y = \sin^{-1}(x)$

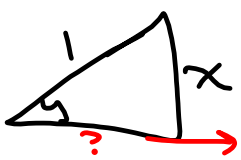
$\sin y = x$

$\frac{d}{dx} \sin y$

$\cos y \frac{dy}{dx} = 1$

$\frac{dy}{dx} = \frac{1}{\cos y}$

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



$\sin y = x$

$\sqrt{1-x^2}$

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

$\frac{d}{dx} \tan^{-1}(x) = \frac{1}{1+x^2}$

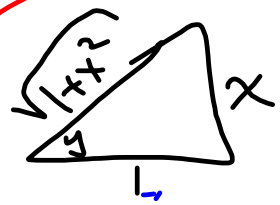
$$\frac{d}{dx}y = \frac{d}{dx}\tan^{-1}(x)$$

$$\tan y = x$$

$$\sec^2 y \cdot \frac{dy}{dx} = 1$$

$$\frac{dy}{dx} = \frac{1}{\sec^2 y}$$

$$\therefore \tan y = \frac{x}{1}$$



$$\frac{1}{\left(\sqrt{1+x^2}\right)^2} = \frac{1}{1+x^2}$$

$$\int \frac{1}{a^2+x^2}\,dx = a\tan^{-1}(x)$$

$$\int \frac{1}{a^2+b^2x^2} = a\tan^{-1}(bx)$$

$$4\int \sec^3\theta\,d\theta =$$

$u = \sec\theta \quad dv = \sec^2 d\theta$

$du = \sec\theta\tan\theta\,d\theta \quad v = \tan\theta$

$$\sec\theta\tan\theta - \int \tan^2\theta\sec\theta\,d\theta$$

~~$u = \tan\theta \quad dv = \sec\tan\theta$~~

NO

~~$du = \sec^2\theta \quad v = \sec\theta$~~

~~$\sec\theta\tan\theta - \sec\theta\tan\theta + \int \sec^2\theta\,d\theta$~~

$$\int \sec^3\theta\,d\theta = \sec\theta\tan\theta - \int(\sec^2\theta - 1)\sec\theta\,d\theta$$

$$\int \sec^3\theta\,d\theta = \sec\theta\tan\theta - \int \sec^3\theta\,d\theta + \int \sec\theta\,d\theta$$

$$\int \sec^3\theta = \frac{1}{2}\sec\theta\tan\theta - \frac{1}{2}\int \sec\theta\,d\theta$$

$$\int \sec\theta\, d\theta = \int \frac{1}{u}\, du$$

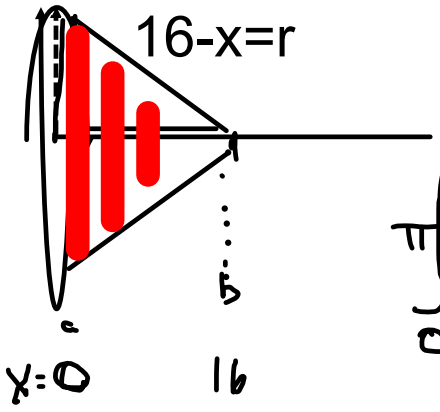
$$\sec\theta\,\frac{(\sec\theta+\tan\theta)}{(\sec\theta+\tan\theta}$$

$$\frac{\sec^2\theta+\sec\theta\tan\theta}{\sec\theta+\tan\theta}$$

$u = \sec\theta+\tan\theta$

$du = \sec^2\theta+\sec\theta\tan\theta\, d\theta$

$\ln|u|\ \ \sec\theta+\tan\theta|$

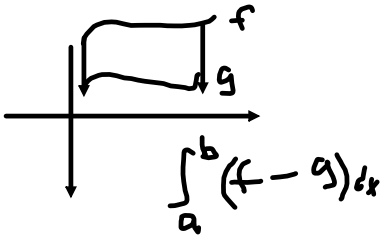


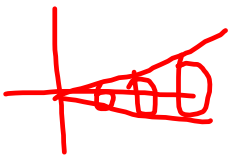
$$\pi\int_0^{16}(16-x)^2\,dx =$$

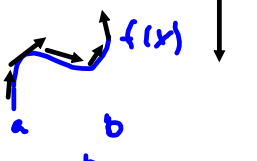
$$\pi\int 16^2-$$

5.1	Area Between Curves
5.2	Volumes
5.3	Volumes by Cylindrical Shells
5.4	Archlength and Surface Area

Word Problems/Applications

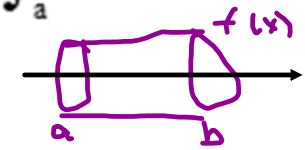






$S = \int_a^b \sqrt{1+[f']^2}$

$$S = \int_a^b 2\pi f(x)\sqrt{1+[f'(x)]^2}\,dx,$$



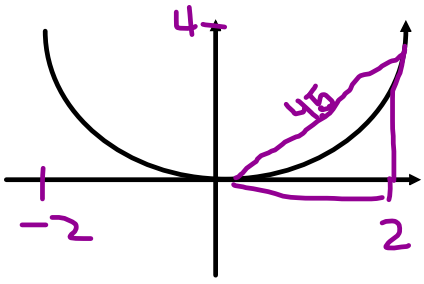
6.1,6.2	Integration by Parts
6.3	Trig Integrals, Trig Substitution
6.4	Partial Fractions
6.1-6.4	Strategies for Integration
6.5	Tables, Computer
6.5	Approximate Integration
6.6	Improper Integration

Techniques of Integration

16. $\int \frac{du}{\sqrt{a^2 - u^2}} = \sin^{-1}\frac{u}{a} + C, \quad a > 0$

17. $\int \frac{du}{a^2 + u^2} = \frac{1}{a}\tan^{-1}\frac{u}{a} + C$

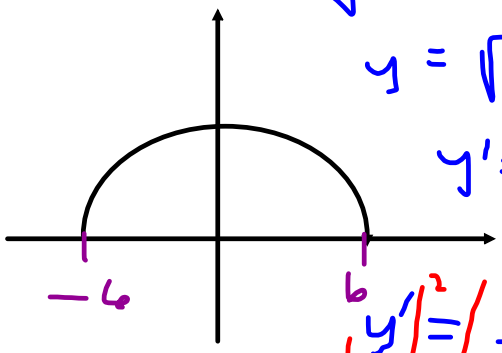
18. $\int \frac{du}{u\sqrt{u^2 - a^2}} = \frac{1}{a}\sec^{-1}\frac{u}{a} + C$



$y = x^2$

$$S: \int_{-2}^{2} \sqrt{1 + (2x)^2}\, dx$$

$$= 9.29$$



$y^2 = 36 - x^2$

$y = \sqrt{36 - x^2}$

$y' = \frac{1}{2}(36 - x^2)^{-1/2}(-2x)$

$(y')^2 = \left(\frac{-x}{\sqrt{36 - x^2}}\right)^2 = \frac{x^2}{36 - x^2}$

$$S = \int_{-6}^{6} 2\pi \left(\sqrt{36 - x^2}\right)\sqrt{1 + \frac{x^2}{36 - x^2}}\,dx$$