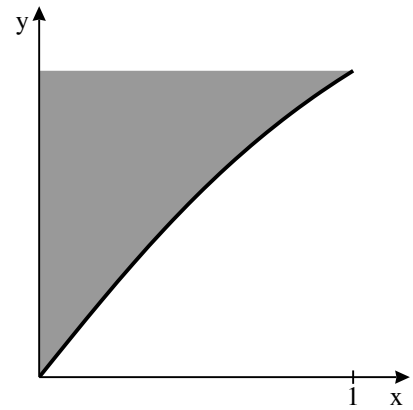
1 Stewart, section 7.4: #1, 8, 9, 13, 17, 23, 32, 39, 42, 65

2 Stewart, section 7.5: #3, 6, 9, 11, 17, 22, 23, 32

3 Stewart, section 7.7: #5, 9, 10, 30, 39

4 The portion of the graph of $y = \tan^{-1} x$ between $x = 0$ and $x = 1$ is rotated around the y-axis to form a container. The container is filled with water. Use $n = 6$ subdivisions and Simpson's Rule to approximate the work required to pump all the water out over the side. Distance is measured in meters and the density of water is 1000 kg/m^3.



5 Solve the following integrals.

a) $\int x\sqrt{x^2+1}\,dx$

b) $\int_0^4 e^{-\sqrt{x}}\,dx$

c) $\int_0^1 \frac{5}{\sqrt{4-x^2}}dx$

d) $\int x\sqrt{5-x}\,dx$

e) $\int_1^8 \frac{1}{x+x^{1/3}}dx$

f) $\int \sec^2(7x)\tan^4(7x)\,dx$

g) $\int_0^5 \sqrt{25-x^2}\,dx$

h) $\int_0^5 |x-2|\,dx$

i) $\int_0^4 |x^2-6x+8|\,dx$

j) $\int \cos^3 y \sin^2 y\,dy$

k) $\int_1^3 \left(xf(x^2)+3f(x)+5\right)dx$, given that $\int_1^3 f(x)\,dx = 7$, $\int_3^{11} f(x)\,dx = 13$, and $\int_9^{11} f(x)\,dx = 6$

6 For each of these integrals, decide which method you think will work best on the integral. You do not have to compute the integral.

a) $\int \frac{4}{x^2-25}dx$

b) $\int \frac{4}{\sqrt{x^2-25}}dx$

c) $\int x^2\sin(3x)\,dx$

d) $\int_1^4 \tan^3 x\sec^2 x\,dx$

e) $\int_0^1 \sin(\sqrt{x})\,dx$

f) $\int_0^1 \frac{4x+12}{x^2+6x-9}dx$

g) $\int_1^4 \cos^3 x\sin^2 x\,dx$

h) $\int_0^1 \frac{5}{x^2+5x-14}dx$

i) $\int_0^2 x\sqrt{5-x^2}\,dx$

j) $\int_1^4 \frac{\sin(\ln x)}{x}dx$

k) $\int_1^2 \ln(3x)\,dx$

l) $\int_2^4 \frac{5}{x\ln x}dx$

m) $\int_1^4 \frac{3}{(x^2+2)^{3/2}}dx$

n) $\int_0^5 |x-3|\,dx$

7 The following problems are optional. You do not need to hand them in. They are intended to help you study.

a) $\displaystyle\int \frac{\sin x}{1-\cos^2 x}dx$

b) $\displaystyle\int e^{2x}\sin(3x)\,dx$

c) $\displaystyle\int_1^4 \frac{z^2+z+1}{\sqrt{z}}dz$

d) $\displaystyle\int \frac{\sin(\pi\sqrt{t})}{\sqrt{t}}dt$

e) $\displaystyle\int_1^2 \frac{x+4}{x^2+8x}dx$

f) $\displaystyle\int_{-3}^3 \sqrt{9-x^2}\,dx$

g) $\displaystyle\int \frac{1+\ln y}{y}dy$

h) $\displaystyle\int x\cos(7x)\,dx$

i) $\displaystyle\int \frac{6x^3+4x+3}{x}dx$

j) $\displaystyle\int t^2e^t\,dt$

k) $\displaystyle\int \cos^3 x\sin x\,dx$