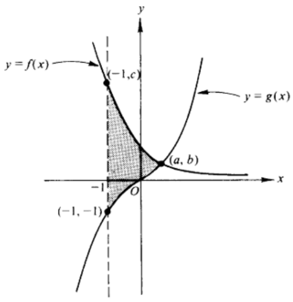
- **7.1 #5-53 odd** **basic integration techniques**
- **7.2 #1-35 odd** **integration by parts**
- **7.3 #3-15odd; 21-37odd; 47-67odd** **trigonometric integrals**
- **7.4 #5-15odd; 19-43odd** **trigonometric substitution**
- **7.5 #15-27 odd** **partial fractions**
- **5.7 #55, 57, 59** **separation of variables**
- 6.5 #9,11,39,40 work

Take-home Quiz #5 - due Tues. 2 Feb
Test #4 - Wed. 3 Feb

1.



The curves $y = f(x)$ and $y = g(x)$ shown in the figure above intersect at the point (a, b). The area of the shaded region enclosed by these curves and the line $x = -1$ is given by

(A) $\int_0^a (f(x) - g(x))\,dx + \int_{-1}^0 (f(x) + g(x))\,dx$

(B) $\int_{-1}^b g(x)\,dx + \int_b^c f(x)\,dx$

(C) $\int_{-1}^c (f(x) - g(x))\,dx$

(D) $\boxed{\int_{-1}^a (f(x) - g(x))\,dx}$

(E) $\int_{-1}^a (|f(x)| - |g(x)|)\,dx$

2.

If the region enclosed by the y-axis, the line $y = 2$, and the curve $y = \sqrt{x}$ is revolved about the y-axis, the volume of the solid generated is

(A) $\boxed{\frac{32\pi}{5}}$ (B) $\frac{16\pi}{3}$ (C) $\frac{16\pi}{5}$ (D) $\frac{8\pi}{3}$ (E) π

3.

The region enclosed by the x-axis, the line $x = 3$, and the curve $y = \sqrt{x}$ is rotated about the x-axis. What is the volume of the solid generated?

(A) 3π (B) $2\sqrt{3}\,\pi$ (C) $\boxed{\frac{9}{2}\pi}$ (D) 9π (E) $\frac{36\sqrt{3}}{5}\pi$

4.

The length of the curve $y = x^3$ from $x = 0$ to $x = 2$ is given by

(A) $\int_0^2 \sqrt{1+x^6}\,dx$ (B) $\int_0^2 \sqrt{1+3x^2}\,dx$ (C) $\pi\int_0^2 \sqrt{1+9x^4}\,dx$

(D) $2\pi\int_0^2 \sqrt{1+9x^4}\,dx$ (E) $\boxed{\int_0^2 \sqrt{1+9x^4}\,dx}$

5.

$\frac{d}{dx}\int_0^x \cos(2\pi u)\,du$ is

(A) 0 (B) $\frac{1}{2\pi}\sin x$ (C) $\frac{1}{2\pi}\cos(2\pi x)$ (D) $\boxed{\cos(2\pi x)}$ (E) $2\pi\cos(2\pi x)$

6. Give the form of the partial fraction decomposition of the rational expression. Do not solve for the constants.

$$\frac{2x-1}{x(x^2+1)^2} = \frac{A}{x} + \frac{Bx+C}{x^2+1} + \frac{Dx+E}{(x^2+1)^2}$$

14. Use partial fractions to evaluate the integral.

$$\int \frac{x^3-x+3}{x^2+x-2}\,dx = \int \left[(x-1) + \frac{2x+1}{x^2+x-2}\right] dx$$

$$\begin{array}{r|l} & x-1 \\ \hline x^2+x-2 & x^3-x+3 \\ & -(x^3+x^2-2x) \\ \hline & -x^2+x+3 \\ & -(-x^2-x+2) \\ \hline & 2x+1 \end{array}$$

44. $\int \frac{\sec^2 x}{\tan x(\tan x+1)}\,dx$ $= \int \frac{1}{u(u+1)}\,du$

$u = \tan x$

$du = \sec^2 x\,dx$

$\frac{1}{u(u+1)} = \frac{A}{u} + \frac{B}{u+1}$

$= \frac{A(u+1)+Bu}{u(u+1)}$

$= \frac{(A+B)u + A}{u(u+1)}$

$A+B=0$

$A=1$; $B=-1$

$\int \left(\frac{1}{u} + \frac{-1}{u+1}\right) du$

$= \boxed{\ln|\tan x| - \ln|\tan x+1| + C}$