6.1 Extra Practice 1–15

PRACTICE PROBLEM SET 20

Now evaluate the following integrals. The answers are in Chapter 21.

1. $\int \frac{1}{x^4}dx = \int x^{-4}dx = \frac{x^{-3}}{-3}+C = \boxed{\frac{-1}{3x^3}+C}$

2. $\int \frac{5}{\sqrt{x}}dx = \int 5x^{-1/2}dx = \frac{5x^{1/2}}{1/2}+C = \boxed{10x^{1/2}+C}$

3. $\int \frac{x^5+7}{x^2}dx = \int\left(\frac{x^5}{x^2}+7x^{-2}\right) = \int(x^3+7x^{-2})dx = \frac{x^4}{4}+\frac{7x^{-1}}{-1}+C = \frac{x^4}{4}-\frac{7}{x}+C$

4. $\int(5x^4-3x^2+2x+6)dx = \frac{5x^5}{5}-\frac{3x^3}{3}+\frac{2x^2}{2}+6x = x^5-x^3+x^2+6x+C$

5. $\int(3x^{-3}-2x^{-2}+x^4+16x^7)dx = \frac{3x^{-2}}{-2}-\frac{2x^{-1}}{-1}+\frac{x^5}{5}+\frac{16x^8}{8} = \frac{-3}{2x^2}+\frac{2}{x}+\frac{x^5}{5}+2x^8+C$

6. $\int(1+x^2)(x-2)dx = \int(x+x^3-2-2x^2)dx = \frac{x^2}{2}+\frac{x^4}{4}-2x-\frac{2x^3}{3}+C$

7. $\int x^{\frac{1}{3}}(2+x)dx = \int\left(2x^{1/3}+x^{4/3}\right)dx = \frac{2x^{4/3}}{\frac{4}{3}}+\frac{x^{7/3}}{\frac{7}{3}}+C = \frac{3}{2}x^{4/3}+\frac{3}{7}x^{7/3}+C$

$(x^3+x)(x^3+x)$

8. $\int(x^3+x)^2dx = \int(x^6+2x^4+x^2)dx = \frac{x^7}{7}+\frac{2x^5}{5}+\frac{x^3}{3}+C$

9. $\int\frac{x^6-2x^4+1}{x^2}dx = \int(x^4-2x^2+x^{-2}) = \frac{x^5}{5}-\frac{2}{3}x^3+-\frac{1}{x}+C$

Skip ~~10.~~ $\int x(x-1)^3dx$ too long !!

11. $\int(\cos x-5\sin x)dx = \boxed{\sin x+5\cos x+C}$

12. $\int\sec x(\sec x+\tan x)dx = \int(\sec^2x+\sec x\tan x)dx = \boxed{\tan x+\sec x+C}$

13. $\int(\sec^2 x+x)dx = \tan x+\frac{x^2}{2}+C$

Tricky * 14. $\int\frac{\sin x}{\cos^2 x}dx = \int \sin x\cdot\sec^2x = \int\frac{\sin x}{\cos x}\cdot\sec x = \int \sec x\tan x\,dx = \boxed{\sec x+C}$

15. $\int\frac{\cos^3 x+4}{\cos^2 x}dx = \int(\cos x+4\sec^2x)dx = \boxed{\sin x+4\tan x+C}$