

Integration Review "Answer Key"

$$1. \int \frac{\sin x}{3 + \cos x} dx = -\ln(\cos(x) + 3) + Q$$

$$2. \int \cos^2 x dx = \frac{1}{2}x + \frac{1}{4}\sin 2x + R$$

$$3. \int x^4 \ln(x) dx = \frac{1}{5}x^5 \ln(x) - \frac{1}{25}x^5 + S$$

$$4. \int \frac{3}{x^2 + 4x + 5} dx = 3 \arctan(x+2) + T$$

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

$$6. \int \cos^3 x \sin^2 x dx = \frac{1}{10} \sin^3 x \cos(2x) + \frac{7}{30} \sin^3 x + V$$

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

$$8. \int \frac{1}{4x^2+1} dx = \frac{1}{2} \arctan(2x) + A$$

$$9. \int \frac{x}{2x^2+5x+6} dx = \frac{1}{4} \ln(2x^2+5x+6) - \frac{5}{2\sqrt{23}} \arctan\left(\frac{4x+5}{\sqrt{23}}\right) + B$$

$$10. \int \sqrt{4x^2+1} dx = \frac{1}{2}x\sqrt{4x^2+1} + \ln(2x + \sqrt{1+4x^2}) + C$$

$$11. \int x^3 e^{-5x} dx = -\frac{1}{5} e^{-5x} x^3 - \frac{3}{25} e^{-5x} x^2 - \frac{6}{125} e^{-5x} x - \frac{6}{625} e^{-5x} + D$$

$$12. \int \frac{1}{\sqrt{1-9x^2}} dx = \frac{1}{3} \arcsin(3x) + E$$

$$13. \int \frac{1}{(t-3)^2(t+4)} dt = \frac{-1}{7(t-3)} - \frac{1}{49} \ln(t-3) + \frac{1}{49} \ln(t+4) + F$$

$$14. \int \frac{16}{(x-2)^2(x^2+4)} dx = \frac{x \ln(x^2+4)}{2(x-2)} - \frac{\ln(x^2+4)}{x-2} - \frac{2}{x-2} - \frac{x \ln(x-2)}{x-2} + \frac{2 \ln(x-2)}{x-2} + G$$

Integration Review Cont.

15.

$$\int \sec^5 x \tan x dx = \frac{\sec^5(x)}{5} + H$$

16. $\int \tan^6(x) dx = -x + \frac{23}{15} \tan(x) + \frac{1}{5} \tan(x) \sec^4(x) - \frac{11}{15} \tan(x) \sec^2(x) + \underline{I}$

17. $\int \cos^3 x dx = \frac{3}{4} \sin(x) + \frac{1}{12} \sin(3x) + \underline{J}$

18. ~~$\int \frac{x^3}{1-x^2} dx$~~ $\int \frac{x^3}{1-4x^2} dx = \frac{-x^2}{8} - \frac{1}{32} \ln(4x^2-1) + \frac{1}{32} + K$