

**Math 1552, Integral Calculus
Integration Review Problems**

Evaluate each of the following integrals.

1. $\int \frac{x+2}{x+1} dx$

2. $\int \sqrt{25 - x^2} dx$

3. $\int \tan^3(x) \sec^4(x) dx$

4. $\int x \tan^{-1}(x) dx$

5. $\int \frac{dx}{x\sqrt{1+x^2}}$

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

7. $\int \frac{x+1}{x^2-4x+8} dx$

Answers

1. $x + \ln|x+1| + C$ (long division)

2. $\frac{25}{2} \sin^{-1}\left(\frac{x}{5}\right) + \frac{x\sqrt{25-x^2}}{2} + C$ (trig sub)

3. $\frac{1}{4} \tan^4(x) + \frac{1}{6} \tan^6(x) + C$ (trig identities)

4. $\frac{x^2}{2} \tan^{-1}(x) - \frac{x}{2} + \frac{1}{2} \tan^{-1}(x) + C$ (by parts)

5. $-\ln\left|\frac{\sqrt{1+x^2}}{x} + \frac{1}{x}\right| + C$ (trig sub)

6. $-2\ln|x| + \frac{1}{x} + 2\ln|x-1| + C$ (partial fractions)

7. $\frac{1}{2} \ln|x^2 - 4x + 8| + \frac{3}{2} \tan^{-1}\left(\frac{x-2}{2}\right) + C$ (rational function)