Math 122 - #6
Partial Fractions

Compute the following integrals:

1. $\displaystyle \int \frac{dx}{x^2 - 1}$

2. $\displaystyle \int \frac{dx}{4x^2 - 9}$

3. $\displaystyle \int \frac{x + 2}{x^2 - 4x} \, dx$

4. $\displaystyle \int \frac{2x - 3}{(x - 1)^2} \, dx$

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

6. $\displaystyle \int \frac{x^2 - 1}{x^3 + x} \, dx$

7. $\displaystyle \int \frac{4x^2 - 9x - 1}{(x + 1)(x - 1)(x - 2)} \, dx$

8. $\displaystyle \int \frac{2x^3 + 4x^2 + 5x + 5}{(x + 1)(x + 2)(x^2 + 1)} \, dx$

Answers

1. $\frac{1}{2}\ln|x-1| - \frac{1}{2}\ln|x+1| + C$

2. $\frac{1}{12}\ln|2x-3| - \frac{1}{12}\ln|2x+3| + C$

3. $\frac{3}{2}\ln|x-4| - \frac{1}{2}\ln|x| + C$

4. $\frac{1}{x-1} + 2\ln|x-1| + C$

5. $\frac{1}{x} + 2\ln x - 2\ln|x+1| + C$

6. $\ln|x^2+1| - \ln|x| + C$

7. $3\ln|x-1| + 2\ln|x+1| - \ln|x-2| + C$

8. $\ln|x+1| + \ln|x+2| + \arctan x + C$