

Additional Integration 3

If you have a Rational function & u-substitution does not work & it is not a transcendental; what do you do ???

Marilyn OR Dolly

1. If degree of the numerator \geq degree of denominator, then use long division to Rewrite. Then integrate.

J-L0

2. If the degree in the numerator $<$ degree of denominator, then use partial fraction decomposition to simplify. Then integrate.

Additional Integration 4

$$\int \frac{x^2+2}{x+3} dx$$

$$\int \frac{x^2+2}{x+3} \text{ Dolly}$$

$$\int \frac{\text{Remainder}}{\text{divisor}}$$

$$\int x-3 + \frac{11}{x+3} dx$$

$$\frac{x^2}{2} - 3x + 11 \ln|x+3| + C$$

Traditional Division

$$\begin{array}{r} x-3 \\ x+3 \overline{) x^2 + 0x + 2} \\ \underline{-x^2 + 3x} \\ -3x + 2 \\ \underline{+3x + 9} \\ 11 \end{array}$$

$$\begin{array}{l} \frac{x^2}{x} = x \\ \frac{x}{x} = 1 \\ \frac{-3x}{x} = -3 \end{array}$$

- Divide
- Multiply
- Subtract

Additional Integration 5

$$\int \frac{2x-1}{x^2-5x+6}$$

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$$-3 \int \frac{1}{x-2} + 5 \int \frac{1}{x-3} \quad \frac{2x-1}{(x-2)(x-3)} = \frac{A(x-3)}{x-2(x-3)} + \frac{B(x-2)}{x-3(x-2)}$$

$$-3 \ln|x-2| + 5 \ln|x-3| + C \quad 2x-1 = A(x-3) + B(x-2)$$

$$\boxed{\text{let } x=3} \quad 2(3)-1 = B(1) \quad 5 = B$$

$$\boxed{\text{let } x=2} \quad 2(2)-1 = A(-1) \quad 3 = -A \quad A = -3$$