

**Created by T. Madas**

# **INTEGRATION**

## **BY A SPECIAL MANIPULATION**

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**Question 1**

Carry out the following integrations:

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

$$2. \int \frac{x-2}{x+2} dx = x - 4 \ln|x+2| + C$$

$$3. \int \frac{x+2}{x+5} dx = x - 3 \ln|x+5| + C$$

$$4. \int \frac{x-3}{x-8} dx = x + 5 \ln|x-8| + C$$

$$5. \int \frac{2x-3}{x+2} dx = 2x - 7 \ln|x+2| + C$$

$$6. \int \frac{3x-1}{x-1} dx = 3x + 2 \ln|x-1| + C$$

$$7. \int \frac{4x+3}{2x-1} dx = 2x + \frac{5}{2} \ln|2x-1| + C$$

$$8. \int \frac{3-x}{x-1} dx = -x + 2 \ln|x-1| + C$$

$$9. \int \frac{x+3}{2x-1} dx = \frac{1}{2}x + \frac{7}{4} \ln|2x-1| + C$$

$$10. \int \frac{3x+1}{2x-1} dx = \frac{3}{2} + \frac{5}{4} \ln|2x-1| + C$$

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$$\begin{aligned}
 1. \quad & \int \frac{2x+1}{2x-1} dx = \int \frac{(2x-1)+2}{(2x-1)} dx = \int 1 + \frac{2}{2x-1} dx = 2x + 2\ln|2x-1| + C \\
 2. \quad & \int \frac{x-2}{x+2} dx = \int \frac{(x+2)-4}{(x+2)} dx = \int 1 - \frac{4}{x+2} dx = x - 4\ln|x+2| + C \\
 3. \quad & \int \frac{2x+5}{2x+3} dx = \int \frac{(2x+3)+2}{(2x+3)} dx = \int 1 + \frac{2}{2x+3} dx = 2x + 3\ln|2x+3| + C \\
 4. \quad & \int \frac{2x-3}{2-x} dx = \int \frac{(2-x)+5}{(2-x)} dx = \int 1 + \frac{5}{2-x} dx = x + 5\ln|2-x| + C \\
 5. \quad & \int \frac{2x+3}{2x+2} dx = \int \frac{2(2x+2)-7}{(2x+2)} dx = \int 2 - \frac{7}{2x+2} dx = 2x - 7\ln|2x+2| + C \\
 6. \quad & \int \frac{3x-1}{2x-1} dx = \int \frac{3(2x-1)+2}{(2x-1)} dx = \int 3 + \frac{2}{2x-1} dx = 3x + 2\ln|2x-1| + C \\
 7. \quad & \int \frac{4x+3}{2x+1} dx = \int \frac{2(2x+1)+5}{(2x+1)} dx = \int 2 + \frac{5}{2x+1} dx = 2x + 5\ln|2x+1| + C \\
 8. \quad & \int \frac{3-2x}{2x-1} dx = \int \frac{-2(x-1)+2}{2x-1} dx = -1 + \frac{2}{2x-1} dx = -x + 2\ln|2x-1| + C \\
 9. \quad & \int \frac{2+3}{2x-1} dx = \int \frac{\frac{1}{2}(2x-1)+\frac{7}{2}}{(2x-1)} dx = \int \frac{1}{2} + \frac{7}{2x-1} dx = \frac{1}{2}x + \frac{7}{2}\ln|2x-1| + C \\
 10. \quad & \int \frac{2x+1}{2x-1} dx = \int \frac{\frac{3}{2}(2x-1)+\frac{5}{2}}{(2x-1)} dx = \int \frac{3}{2} + \frac{5}{2x-1} dx = \frac{3}{2}x + \frac{5}{2}\ln|2x-1| + C
 \end{aligned}$$