

$$\int \frac{5x-1}{(x-3)(x+4)} dx = \frac{A(x+4)}{(x-3)(x+4)} + \frac{B(x-3)}{(x+4)(x-3)} = \frac{2}{x-3} + \frac{3}{x+4}$$

$\int \left[\frac{2}{x-3} + \frac{3}{x+4} \right] dx$
 $2 \ln|x-3| + 3 \ln|x+4| + C$

$$\frac{5x-1}{(x-3)(x+4)} = \frac{A(x+4) + B(x-3)}{(x-3)(x+4)}$$

$$\frac{5x-1}{(x-3)(x+4)} = \frac{Ax+4A+Bx-3B}{(x-3)(x+4)}$$

$$5x = Ax+Bx \quad (5=A+B) \cdot 3$$

$$-1 = 4A-3B \quad -1=4A-3B$$

$$A=2$$

$$5=A+B$$

$$5=2+B$$

$$B=3$$

$$15=3A+3B$$

$$-1=4A-3B$$

$$14=7A+0$$

$$2=A$$

$$\frac{6x+7}{(x+2)^2} = \frac{A(x+2)}{(x+2)(x+2)} + \frac{B}{(x+2)^2} = \frac{Ax+2A+B}{(x+2)^2}$$

$$Ax = 6x \quad 2A+B=7$$

$$A=6 \quad 2 \cdot 6+B=7$$

$$B=-5$$

$$\frac{6x+7}{(x+2)^2} = \frac{6}{x+2} - \frac{5}{(x+2)^2}$$

$$\int \frac{6x+7}{(x+2)^2} = \int \left[\frac{6}{x+2} - 5(x+2)^{-2} \right] dx = 6 \ln|x+2| - 5 \cdot \frac{1}{-1} (x+2)^{-2+1} + C = 6 \ln|x+2| + 5(x+2)^{-1} + C$$

$$\frac{6x+7}{(x+2)^2} = \frac{A}{x+2} + \frac{B}{x+2}$$

~~$$\frac{6x+7}{(x+2)^2} = \frac{(A+B)(x+2)}{(x+2)(x+2)}$$~~

~~$$6x+7 = Ax + Bx + 2A + 2B$$~~

~~$$6 = A + B$$~~

~~$$7 = 2A + 2B$$~~

~~$$-5 \neq 0$$~~

$$\frac{2x^3 - 4x^2 - x - 3}{x^2 - 2x - 3}$$

$$\begin{array}{r}
 x^2 - 2x - 3 \overline{) 2x^3 - 4x^2 - x - 3} \\
 \underline{-(2x^3 - 4x^2 - 6x)} \\
 0 + 0 + 5x - 3
 \end{array}$$

$$\frac{2x^3 - 4x^2 - x - 3}{x^2 - 2x - 3} = 2x + \frac{5x - 3}{x^2 - 2x - 3} = 2x + \frac{5x - 3}{(x-3)(x+1)} = 2x + \frac{3}{x-3} + \frac{2}{x+1}$$

$$\frac{5x-3}{(x-3)(x+1)} = \frac{A(x+1)}{(x-3)(x+1)} + \frac{B(x-3)}{(x+1)(x-3)} = \frac{Ax + A + Bx - 3B}{(x+1)(x-3)}$$

$$\begin{array}{l}
 5x = Ax + Bx \\
 -3 = A - 3B
 \end{array}
 \Rightarrow
 \begin{array}{l}
 5 = A + B \\
 -3 = A - 3B
 \end{array}
 \Rightarrow
 \begin{array}{l}
 5 = A + 2 \\
 A = 3
 \end{array}$$

$$8 = 0 + 4B$$

$$B = 2$$

$$\frac{x-2}{(x+1)(x-1)^2} = \frac{A}{x+1} + \frac{B}{x-1} + \frac{C}{(x-1)^2}$$

$$\frac{x-2}{(x+1)(x-1)^2} = \frac{A(x-1)^2 + B(x+1)(x-1) + C(x+1)}{(x+1)(x-1)^2}$$

$$x-2 = A(x^2-2x+1) + B(x^2-1) + C(x+1)$$

$$x-2 = Ax^2 - 2Ax + A + Bx^2 - B + Cx + C$$

$$0 = Ax^2 + Bx^2$$

$$0 = A+B \Rightarrow A = -B$$

$$x = -2Ax + Cx$$

$$\Rightarrow \begin{cases} 1 = -2A + C \\ -2 = A - B + C \end{cases}$$

$$1 = -2A + C$$

$$1 = -2A + C$$

$$-2 = A + A + C$$

$$-2 = 2A + C$$

$$1 = -2A + C \Rightarrow 1 = -2A + \frac{1}{2}$$

$$-2 = 2A + C \Rightarrow -2 = 2A + \frac{1}{2}$$

$$-1 = 2C$$

$$-\frac{1}{2} = C$$

$$\frac{3}{2} = -2A$$

$$-\frac{3}{4} = A$$

$$\frac{3}{4} = B$$

$$\frac{-3}{4(x+1)} + \frac{3}{4(x-1)} + \frac{-1}{2(x-1)^2}$$

$$\frac{2x-1}{(x+1)(x^2+1)} =$$

$$\frac{2x-1}{(x+1)(x^2+1)} = \frac{A}{x+1} + \frac{Bx+C}{x^2+1}$$

$$\frac{2x-1}{(x+1)(x^2+1)} = \frac{A(x^2+1) + (Bx+C)(x+1)}{(x+1)(x^2+1)}$$

$$2x-1 = Ax^2 + A + Bx^2 + Bx + Cx + C$$

$$0 = Ax^2 + Bx^2 \Rightarrow A = -B$$

$$\left. \begin{array}{l} 2x = Bx + Cx \\ -1 = A + C \end{array} \right\} \begin{array}{l} 2 = B + C \\ -1 = -B + C \end{array}$$

$$\begin{array}{r} 2 = B + C \\ -1 = -B + C \\ \hline 1 = 0 + 2C \\ \frac{1}{2} = C \end{array}$$

$$\begin{array}{l} 2 = B + \frac{1}{2} \\ \frac{3}{2} = B \\ A = -\frac{3}{2} \end{array}$$

$$2. \frac{5x+7}{\underbrace{x^3+2x^2}_{x^2(x+2)} \underbrace{-x-2}_{-1(x+2)}}$$

$$a^2 - b^2 = (a-b)(a+b)$$

$$\begin{array}{l} (x+2)(x^2-1) \\ (x+2)(x-1)(x+1) \end{array}$$

