

Memo
Date

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19/mhs01/438

1.) $\int \frac{(1-3x)}{(x+3)(x-1)} dx$

$\int \left[\frac{A}{(x+3)} + \frac{B}{(x-1)} \right]$

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

$1-3x = A(x-1) + B(x+3)$

when $x = -3$ $\left. \begin{matrix} x = -3 \\ x = 1 \end{matrix} \right\}$

$\Rightarrow 11 - 3(-3) = A(-3-1) + B(-3+3)$

$11 + 9 = A(-4)$

$20 = -4A$

$\therefore A = -5$

when $x = 1$

$1 - 3(1) = A(1-1) + B(1+3)$

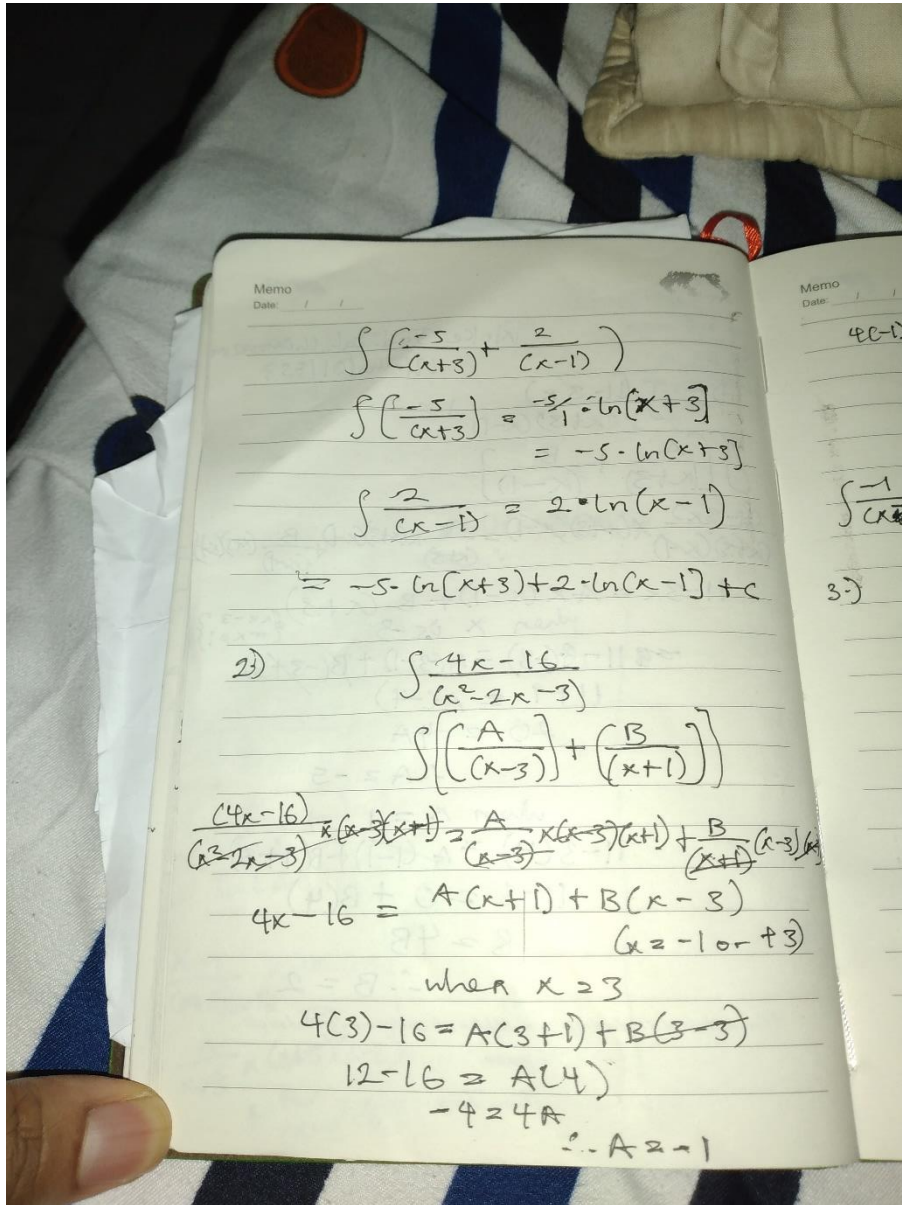
$1 - 3 = 0 + B(4)$

$8 = 4B$

$\therefore B = 2$

"Become the kind of leader that people would follow voluntarily; even if you had no title or position."

- Brian Tracy



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when $x = -1$
 $4(-1) - 16 = A(-1+1) + B(-1-3)$
 $-20 = B(-4)$
 $\therefore B = 5$
 $\Rightarrow \int \left[\frac{-1}{(x-3)} + \frac{5}{(x+1)} \right]$
 $\int \frac{-1}{(x-3)} = -1 \cdot \ln(x-3), \int \frac{5}{(x+1)} = 5 \cdot \ln(x+1)$
 $\Rightarrow -1 \cdot \ln(x-3) + 5 \cdot \ln(x+1) + C$

3.) $\int \frac{(2x^2 - 9x - 35)}{(x+1)(x-2)(x+3)}$ | $2x^2 - 9x - 35 = Ax^2 + Bx^2 + Cx^2 + Ax + 4Bx - (x - 6A + 3B - 2C)$
 $\frac{A}{(x+1)} + \frac{B}{(x-2)}$ | $A + B + C = 2$ (i)
 $A + 4B - C = -9$ (ii)
 $-6A + 3B - 2C = -35$ (iii)
 Put (ii) into (i)
 $A + B - C = -9$
 $A + B + C = 2$
 $3B - 2C = -11$ (iv)

$2x^2 - 9x - 35 = A(x-2)(x+3) + B(x+1)(x+3) + C(x+1)(x-2)$
 $2x^2 - 9x - 35 = Ax^2 + Ax + Bx^2 + 4Bx + 3B + Cx^2 + Cx - 2C$
 $-2C$

*"Don't judge me by my successes, judge me by how many times I fell down and got back up again."
 - Nelson Mandela*

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Solve (ii) & (1)

$$-6A + 3B - 2C = -35 \quad (1)$$

$$A + 24B - 6C = 9 \quad (2)$$

$$27B - 8C = -89 \quad (3)$$

Solve (3) & (2)

$$27B - 8C = -89 \quad (3)$$

$$-27B - 2C = -11 \quad (4)$$

$$10C = 10$$

$$\therefore C = 1$$

equat C=1 into (3)

$$3B - 2(1) = -11$$

$$3B - 2 = -11$$

$$3B = -9$$

$$\therefore B = -3$$

from equ (1)

$$A + B + C = 2$$

$$A - 3 + 1 = 2 \quad \therefore A = 4$$

$$\int \frac{2x^2 - 4x - 35}{(x+1)(x-2)(x+3)} dx = \int \frac{4}{x+1} dx + \int \frac{3}{x-2} dx + \int \frac{1}{x+3} dx$$

$$\Rightarrow 4 \cdot \ln|x+1| - 3 \ln|x-2| + \ln|x+3| + C$$

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