Symbolab

Solution

Simplify $\frac{1}{4x+1}-\frac{1}{3}+\frac{1}{2x-3}$: $\frac{-8x^2+28x-3}{3(4x+1)(2x-3)}$

Steps

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

Least Common Multiplier of $4x+1, 3, 2x-3$: $3(4x+1)(2x-3)$ *Show Steps*

Adjust Fractions based on the LCM *Hide Steps*

Multiply each numerator by the same amount needed to multiply its corresponding denominator to turn it into the LCM $3(4x+1)(2x-3)$

For $\frac{1}{4x+1}$: multiply the denominator and numerator by $3(2x-3)$

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

For $\frac{1}{3}$: multiply the denominator and numerator by $(4x+1)(2x-3)$

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

For $\frac{1}{2x-3}$: multiply the denominator and numerator by $3(4x+1)$

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

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

Apply the fraction rule: $\frac{a}{c}\pm\frac{b}{c}=\frac{a\pm b}{c}$

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

Simplify $3(2x-3)-(4x+1)(2x-3)+3(4x+1)$: $-8x^2+28x-3$ *Hide Steps*

$3(2x-3)-(4x+1)(2x-3)+3(4x+1)$

Expand $3(2x-3)$: $6x-9$ *Show Steps*

$= 6x - 9 - (4x+1)(2x-3) + 3(4x+1)$

Expand $-(4x+1)(2x-3)$: $-8x^2 + 10x + 3$ *Hide Steps*

$-(4x+1)(2x-3)$

Apply FOIL method: $(a+b)(c+d) = ac + ad + bc + bd$

$(4x+1)(2x-3) = 4x \cdot 2x + 4x(-3) + 1 \cdot 2x + 1 \cdot (-3)$

$= -(4x \cdot 2x + 4x(-3) + 1 \cdot 2x + 1 \cdot (-3))$

Simplify $4x \cdot 2x + 4x(-3) + 1 \cdot 2x + 1 \cdot (-3)$: $8x^2 - 10x - 3$ *Show Steps*

$= -(8x^2 - 10x - 3)$

Apply the distributive law: $-(a-b) = -a + b$

$-(8x^2 - 10x - 3) = -8x^2 + 10x + 3$

$= -8x^2 + 10x + 3$

$= 6x - 9 - 8x^2 + 10x + 3 + 3(4x+1)$

Expand $3(4x+1)$: $12x + 3$ *Show Steps*

$= 6x - 9 - 8x^2 + 10x + 3 + 12x + 3$

Simplify $6x - 9 - 8x^2 + 10x + 3 + 12x + 3$: $-8x^2 + 28x - 3$ *Show Steps*

$= -8x^2 + 28x - 3$

$= \frac{-8x^2 + 28x - 3}{3(4x+1)(2x-3)}$