

4.4: Practice with Rational Expressions

Ex 1) $\frac{k-1}{k^2-4} + \frac{7k}{4k^2+7k-2} - \frac{8}{k^2-4k+4}$

$\frac{k-1}{(k+2)(k-2)} + \frac{7k}{(4k-1)(k+2)} - \frac{8}{(k-2)(k-2)}$

$4k^2 + 7k - 2$
 $4k^2 + 8k - k - 2$
 $4k(k+2) - (k+2)$
 $(4k-1)(k+2)$

LCD: $(k+2)(k-2)(k-2)(4k-1)$

$\frac{(k-1)}{(k+2)(k-2)} \cdot \frac{(k-2)(4k-1)}{(k-2)(4k-1)} + \frac{7k}{(4k-1)(k+2)} \cdot \frac{(k-2)(k-2)}{(k-2)(k-2)} - \frac{8}{(k-2)(k-2)} \cdot \frac{(k+2)(4k-1)}{(k+2)(4k-1)}$

$\frac{(k-1)(k-2)(4k-1) + 7k(k-2)(k-2) - 8(k+2)(4k-1)}{(k+2)(k-2)(k-2)(4k-1)}$

$(k^2 - 2k - k + 2)(4k - 1) + 7k(k^2 - 2k - 2)(k + 4) - 8(4k^2 - k + 8k - 2)$

$4k^3 - k^2 - 12k^2 + 3k + 8k - 2 + 7k^3 - 28k^2 + 28k - 32k^2 - 56k + 16$

$11k^3 - 73k^2 - 17k + 14$

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$(k+2)(k-2)^2(4k-1)$

$k \neq \pm 2, \frac{1}{4}$

$$\text{Ex 2)} \quad \frac{x-1}{2x^2} - \frac{2x-1}{9x} + \frac{5x}{12}$$

$$\text{LCD: } 36x^2$$

$$2 \cdot 4 \cdot 6 \cdot 8 \dots \cdot (36)$$

$$9 \cdot 18 \cdot 27 \cdot (36) \dots$$

$$12 \cdot 24 \cdot (36) \dots$$

$$\frac{x-1}{2x^2} \cdot \frac{18}{18} - \frac{2x-1}{9x} \cdot \frac{4x}{4x} + \frac{5x}{12} \cdot \frac{3x^2}{3x^2}$$

$$\frac{18x - 18 - 8x^2 + 4x + 15x^3}{36x^2}$$

$$\boxed{\frac{15x^3 - 8x^2 + 22x - 18}{36x^2}}$$

$x \neq 0$

$$\text{Ex 3)} \quad \frac{-6x}{x-x^2} \rightarrow \frac{-6x}{-x^2+x} = \frac{+6x}{x(x-1)} = \boxed{\frac{6}{x-1}}$$

$x \neq 0, 1$