

Algebra Workshop

I. Find the least common denominator for each of the following options then add.

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

factor: $\frac{\cancel{x-2}}{(x-2)^2} + \frac{\cancel{x}}{2(x+2)} + \frac{3}{(x-2)(x+2)}$

simplify: $\frac{1}{x-2} + \frac{1}{2(x+2)} + \frac{3}{(x-2)(x+2)}$

LCD factors: $(x-2), 2, (x+2)$
 powers: $2(x-2)(x+2)$

multiply: $\frac{2(x+2)}{2(x-2)(x+2)} + \frac{(x-2)}{2(x-2)(x+2)} + \frac{3(2)}{2(x-2)(x+2)}$

add: $\frac{2(x+2) + (x-2) + 3(2)}{2(x-2)(x+2)}$

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

factor: $\frac{3}{x^2} + \frac{x+2}{x^2+4} + \frac{2 \cdot 2}{2x}$
does not factor

simplify: $\frac{3}{x^2} + \frac{x+2}{x^2+4} + \frac{2}{x}$

factors: $(x), (x^2+4)$
 powers: $(x)^2(x^2+4)$

multiply: $\frac{3(x^2+4)}{x^2(x^2+4)} + \frac{x^2(x+2)}{x^2(x^2+4)} + \frac{2(x)(x^2+4)}{x^2(x^2+4)}$

add: $\frac{3(x^2+4) + x^2(x+2) + 2(x)(x^2+4)}{x^2(x^2+4)}$

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

factor: $\frac{2(x)}{(x)x^2} + \frac{x+1}{x^2} + \frac{3}{x}$
x does not cancel

simplify: $\frac{2}{x} + \frac{x+1}{x^2} + \frac{3}{x}$

factors: x
 powers: x^2

multiply: $\frac{2x}{x^2} + \frac{x+1}{x^2} + \frac{3x}{x^2}$

add: $\frac{2x + (x+1) + 3x}{x^2}$

II. Simplify the following fractions.

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

(ii) $\frac{6 \cdot (2x+4)^5(x^2+2x-8)^2 - 2(x^2+2x-8)(2x+4)^6}{(x^2+2x-8)^4}$

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

 = term ; to be a common factor it must appear in every term.

common factor: $(x-3)$
 lowest power: $(x-3)^2$

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

$\frac{6(2^5)(x+2)^5(x+4)^2(x-2)^2 - 2(x+4)(x-2)(2^6)(x+2)^6}{(x+4)^4(x-2)^4}$

common factors: $(x+4)(x-2)$
 lowest powers: $(x+4)^1(x-2)^1$

$\frac{6(2^5)(x+2)^5(x+4)(x-2) - 2(2^6)(x+2)^6}{(x+4)^3(x-2)^3}$

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

common factor: $(x+2)$
 lowest power: $(x+2)^2$

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

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