Quiz C: Partial Fractions Name_____

Find the partial fraction decomposition.

1. $\frac{5}{x^2-8x} = \frac{-5/8}{x} + \frac{5/8}{x-8} = \frac{-5}{8x} + \frac{5}{8(x-8)}$

$\frac{5}{x(x-8)} = \frac{A}{x} + \frac{B}{x-8}$

$5 = A(x-8) + Bx$

$x=8$: $5 = 8B$, $\frac{5}{8} = B$

$x=0$: $5 = -8A$, $-\frac{5}{8} = A$

2. $\frac{x-4}{x^2+9x+8} = \frac{12/7}{x+8} + \frac{-5/7}{x+1} = \frac{12}{7(x+8)} - \frac{5}{7(x+1)}$

$\frac{x-4}{(x+8)(x+1)} = \frac{A}{x+8} + \frac{B}{x+1}$

$x-4 = A(x+1) + B(x+8)$

$x=-1$: $-5 = 7B$, $\frac{-5}{7} = B$

$x=-8$: $-12 = -7A$, $\frac{12}{7} = A$

3. $\frac{3x-2}{x^2-25} = \frac{17/10}{x+5} + \frac{13/10}{x-5} = \frac{17}{10(x+5)} + \frac{13}{10(x-5)}$

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

$3x-2 = A(x-5) + B(x+5)$

$x=5$: $13 = 10B$, $\frac{13}{10} = B$

$x=-5$: $-17 = -10A$, $\frac{17}{10} = A$

4. $\frac{3x^2+2x-8}{2x^3-32x} = \frac{1/2}{2x} + \frac{1/2}{x+4} + \frac{3/4}{x-4}$

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

$\frac{3x^2+2x-8}{2x(x+4)(x-4)} = \frac{A}{2x} + \frac{B}{x+4} + \frac{C}{x-4}$

$3x^2+2x-8 = A(x+4)(x-4) + B(2x)(x-4) + C(2x)(x+4)$

$x=0$: $-8 = -16A$, $\frac{1}{2} = A$

$x=-4$: $32 = 64B$, $\frac{1}{2} = B$

$x=4$: $48 = 64C$, $\frac{48}{64} = \frac{64C}{64}$, $\frac{3}{4} = C$

5. $\frac{2x^2+x+3}{x^2-9} = 2 + \frac{x+21}{x^2-9}$

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

$$\begin{array}{r} 2 \\ x^2-9 \overline{\big) 2x^2+x+3} \\ -2x^2 \quad +18 \\ \hline x+21 \end{array}$$

$\frac{x+21}{x^2-9} = \frac{A}{x+3} + \frac{B}{x-3}$

$x+21 = A(x-3) + B(x+3)$

$x=3$: $24 = 6B$, $4 = B$

$x=-3$: $18 = -6A$, $-3 = A$