

Instructions: Show all work. Use exact answers unless specifically asked to round. Answer all parts of each question.

1. Use partial fraction decomposition to decompose the rational expression $\frac{7}{(7x-6)(x^2+9)}$. Solve the for unknowns.

$$\frac{A}{7x-6} + \frac{Bx+C}{x^2+9}$$

$$A(x^2+9) + (Bx+C)(7x-6) = 7$$

$$Ax^2 + 9A + 7Bx^2 + 7Cx - 6Bx - 6C = 7$$

$$A + 7B = 0 \quad (x^2)$$

$$-6B + 7C = 0 \quad (x)$$

$$9A - 6C = 7 \quad (1)$$

$$A = 343/477$$

$$B = -49/477$$

$$C = -14/159$$

$$\frac{(343/477)}{7x-6} - \frac{(49/477)x}{x^2+9} - \frac{(14/159)}{x^2+9}$$

2. Set up the partial fraction decomposition for the expression $\frac{x^2+1}{x(4x-1)^2(x^2+5)(x^2+4)^3}$. Do not solve for the coefficients.

$$\frac{A}{x} + \frac{B}{4x-1} + \frac{C}{(4x-1)^2} + \frac{Dx+E}{x^2+5} + \frac{Fx+G}{x^2+4} + \frac{Hx+I}{(x^2+4)^2} + \frac{Jx+K}{(x^2+4)^3}$$