

Each problem is worth 5 points. Clear and complete justification is required for full credit.

1. State the proper form for the partial fraction decomposition of  $\frac{2x+1}{(x+1)^3(x^2+4)^2}$ .

$$\frac{2x+1}{(x+1)^3(x^2+4)^2} = \frac{A}{(x+1)^3} + \frac{B}{(x+1)^2} + \frac{C}{(x+1)} + \frac{Dx+E}{(x^2+4)^2} + \frac{Fx+G}{(x^2+4)}$$

Great

2. Find the values of  $A$  and  $B$  in  $\frac{x-9}{(x+5)(x-2)} = \frac{A}{x+5} + \frac{B}{x-2}$ .

$$\frac{x-9}{(x+5)(x-2)} = \left[ \frac{A}{x+5} + \frac{B}{x-2} \right] \cdot [(x+5)(x-2)]$$

$$x-9 = (x-2)A + (x+5)B$$

if  $x=2$

$$-7 = 0A + 7B$$

$$\boxed{B = -1}$$

if  $x=-5$

$$-14 = (-7)A + 0B$$

$$\boxed{A = 2}$$

$$\text{so } \frac{x-9}{(x+5)(x-2)} = \frac{2}{x+5} + \frac{-1}{x-2}$$

Excellent