11.9.5-13

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question:

$$\frac{a+bx}{a-bx} = \frac{b+cx}{b-cx} = \frac{c+dx}{c-dx} \tag{1}$$

then show that a b c d are in G.P

solution:

$$\frac{a+bx}{a-bx} = \frac{b+cx}{b-cx} \tag{2}$$

$$ab - acx + b^2x - bcx^2 = ab + acx - b^2x - bcx^2 \tag{3}$$

$$acx = b^2x \tag{4}$$

$$\implies b^2 = ac \tag{5}$$

$$\frac{b+cx}{b-cx} = \frac{c+dx}{c-dx} \tag{6}$$

$$bc - bdx + c^2x - cdx^2 = bc + bdx - c^2x - cdx^2 \tag{7}$$

$$bdx = c^2x \tag{8}$$

$$\implies c^2 = bd \tag{9}$$

a,b,c are in G.P and b,c,d are in G.P
So a,b,c,d are in G.P