Answer on Question #66009 – Math – Calculus

Question

Prove that the functions g(x, y)= (2x-3y)/(4x+5y) and h(x,y)=x/y, y≠0, y≠-(4/5)x are functionally dependent.

Solution

$g(x,y)=\frac{2x-3y}{4x+5y}$ and $h(x,y)=\frac{x}{y}$.

By definition, two functions are called functionally dependent if they are functions of each other [1, page 214]. Try to express one function through another. Divide the numerator and denominator of $g(x,y)$ by y

$$g(x,y)=\frac{2x-3y}{4x+5y}=\frac{\frac{2x}{y}-3}{\frac{4x}{y}+5}$$

However

$$\frac{x}{y}=h(x,y)$$

Then we have

$$g(x,y)=\frac{2h(x,y)-3}{4h(x,y)+5}$$

Thus the function $g(x,y)$ is the function of $h(x,y)$ and one can say that these functions are functionally dependent.

Answer: functions $g(x,y)$ and $h(x,y)$ are functionally dependent.

References:

[1] S.S. Sastry. Engineering mathematics, volume two, 4th Edition.