ASSIGNMENT 1

CS21BTECH11053

Problem (6.c)**.** ***ICSE Math Paper (2017):*** *If*

$$\frac{7m+2n}{7m-2n}=\frac{5}{3} \tag{1}$$

use properties of proportion to find:

(i) $\frac{m}{n}$

(ii) $\frac{m^2+n^2}{m^2-n^2}$

Solution:

We are given,

$$\frac{7m+2n}{7m-2n}=\frac{5}{3} \tag{2}$$

From componendo - dividendo, we know

$$\frac{a}{b}=\frac{c}{d}\Rightarrow\frac{a+b}{a-b}=\frac{c+d}{c-d} \tag{3}$$

From (2) and (3)

$$\frac{(7m+2n)+(7m-2n)}{(7m+2n)-(7m-2n)}=\frac{5+3}{5-3} \tag{4}$$

$$\Rightarrow\frac{14m}{4n}=\frac{8}{2} \tag{5}$$

$$\Rightarrow\frac{7m}{2n}=\frac{4}{1} \tag{6}$$

$$\Rightarrow\frac{m}{n}=\boldsymbol{\frac{8}{7}} \tag{7}$$

From (7)

$$\left(\frac{m}{n}\right)^2=\left(\frac{8}{7}\right)^2 \tag{8}$$

$$\Rightarrow\frac{m^2}{n^2}=\frac{8^2}{7^2}=\frac{64}{49} \tag{9}$$

From (3) and (9)

$$\Rightarrow\frac{m^2+n^2}{m^2-n^2}=\frac{64+49}{64-49}=\boldsymbol{\frac{113}{15}} \tag{10}$$

$$\therefore\frac{m}{n}=\boldsymbol{\frac{8}{7}},\frac{m^2+n^2}{m^2-n^2}=\boldsymbol{\frac{113}{15}} \tag{11}$$