NAME: OKWUOKWU BRYAN COURSE: ~~STA 132~~ MAT 102

DEPT.: Mechatronics MATRIC NO.: 19/ENG05/049

① Recall that; $D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$A(6,-5) = (x_1, y_1)$ $B(-2,1) = (x_2, y_2)$ $C(0,3) = (x_3, y_3)$

$\overline{AB} = \sqrt{(6+2)^2 + (-5-1)^2} = \sqrt{64+36} = \sqrt{100} = \cancel{4\sqrt{5}}\ 10$

$\overline{BC} = \sqrt{(-2-0)^2 + (1-3)^2} = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$

$\overline{AC} = \sqrt{(6-0)^2 + (-5-3)^2} = \sqrt{36+64} = \sqrt{100} = 10$

$\overline{AB} = \overline{AC}$ $\therefore$ $\triangle ABC$ is an isosceles triangle

② $P(5,-3) = (x_1, y_1)$ $Q(-4,9) = (x_2, y_2)$ $R(14,-15) = (x_3, y_3)$

Recall; $\dfrac{m(x_3) - n(x_2)}{m-n}, \dfrac{m(y_3) - n(y_2)}{m-n} = (x_1, y_1)$

$\therefore \dfrac{m(x_3) - n(x_2)}{m-n} = x_1 \Rightarrow \dfrac{m(14) + n(4)}{m-n} = 5$

$14m + 4n = 5m - 5n \Rightarrow 14m - 5m = -5n - 4n$

$9m = -9n \Rightarrow m/n = -9/n = -1/1$

$\therefore m : n = -1 : 1$

(ii) Recall; $\dfrac{mx_2 - nx_1}{m-n} = x_3$

$\Rightarrow \dfrac{-4m - 5n}{m-n} = 14 \Rightarrow -4m - 5n = 14m - 14n$

$14m + 4m = 14n - 5n \Rightarrow 18m = 9n \Rightarrow m/n = 9/18$

$\therefore m : n = 1 : 2$