1 Colinear points

Given three points, check whether the three points are colinear or not $p_0(x_0, y_0), p_1(x_1, y_1), p_2(x_2, y_2)$
1. find the equation of two points
2. substitude the third point to the equation and check whether it is zero or not
3. if $f(x, y) = 0$, it is colinear
4. if $f(x, y) > 0$, it is one side
5. if $f(x, y) < 0$, it is other side

$$\begin{aligned} \frac{y - y_0}{x - x_0} &= \frac{y_2 - y_1}{x_2 - x_1} \\ (y - y_0)(x_2 - x_1) &= (x - x_0)(y_2 - y_1) \\ f(x, y) &= (y - y_0)(x_2 - x_1) - (x - x_0)(y_2 - y_1) \end{aligned} \tag{1}$$