

To find area of a parallelogram with vertices

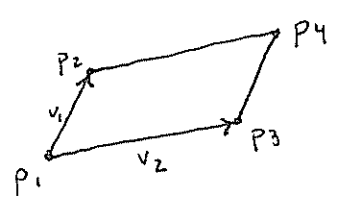
P_1, P_2, P_3, P_4 , find 2 vectors determining the parallelogram:

$$v_1 = P_2 - P_1$$

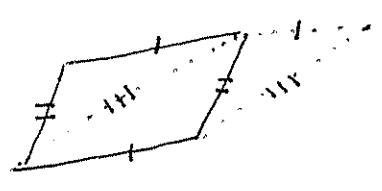
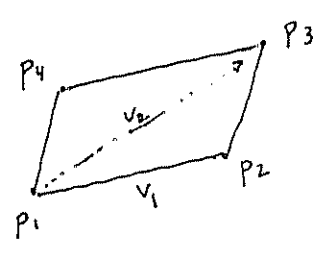
$$v_2 = P_3 - P_1$$

Then compute $|v_1 \times v_2|$.

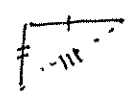
This is either computing the area of the original parallelogram in the case



or the area of the dotted parallelogram



But the difference in area is 0

Because the area of  = area of 