Question: Given triangle ABC has vertices at (-2,4),(-2,-4) and (0,-2), respectively, find the circumcenter of the triangle.

Solution:

The circumcenter of the triangle ABC is the intersection of perpendicular bisectors. So we need to find equations of at least two perpendicular bisectors and find their intersection.

First, let's calculate the midpoint of sides AB and BC which is the average of the x and y coordinates. Midpoint of AB:

x=(-2-2)/2=-2y=(4-4)/2=0(-2,0)Midpoint of BC: x=-2/2=-1

x=-2/2=-1 y=(-4-2)/2=-3 (-1,-3)

Then we need to find the slope of AB and BC using the formula (y2-y1)/(x2-x1)AB is a vertical line, so the slope of its perpendicular bisector is 0. Slope of BC: m=(-2+4)/2=1The slope of the perpendicular bisector of BC is -1/1=-1

Next, we need to find equations of the perpendicular bisectors of the lines AB and BC using the formula y-y1=m(x-x1)For AB with midpoint (-2,0) and slope 0: y=0 (1) For BC with midpoint (-1,-3) and slope -1: y+3=-x-1x+y+4=0 (2) Solving equations (1) and (2) we get values x=-4, y=0 which are the coordinates of the circumcenter of the triangle ABC. **Answer:** (-4,0)

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