#81955, Engineering / Mechanical Engineering | Completed

The vertices of a triangle are situated at points (15, 30), (25, 35) and (5, 45). Find the coordinates of the vertices if the triangle is first rotated 100 counter clockwise direction about the origin and then scaled to twice its size.

Solution.

Let A=(15, 30), B(25, 35), and C(5, 45).

If the triangle is first rotated 100 counter clockwise direction about the origin

A→A1, B→B1, C→C1

$X_{A1}= X_A*\cos100°-Y_A*\sin100°=15*\cos100° - 30*\sin100°= -32$

$Y_{A1}= X_A* \sin100°+ Y_A* \cos100°= 15*\sin100°+ 30*\cos100°=9.6$

$X_{B1}= X_B*\cos100°-Y_B*\sin100°=25*\cos100° - 35*\sin100°= -38.8$

$Y_{B1}= X_B* \sin100°+ Y_B* \cos100°= 25*\sin100°+ 35*\cos100°=18.5$

$X_{C1}= X_C*\cos100°-Y_C*\sin100°=5*\cos100° - 45*\sin100°= -45.2$

$Y_{C1}= X_C* \sin100°+ Y_C* \cos100°= 5*\sin100°+ 45*\cos100°= -2.9$

A1(-32;9.6), B1(-38.8;18.5), C1(-45.2;-2.9)

If the triangle scaled to twice its size

A1→A2, B1→B2, C1→C2

$X_{A2}= X_{A1}/2$ $Y_{A2}= Y_{A1}/2$

$X_{B2}= X_{B1}/2$ $Y_{B2}= Y_{B1}/2$

$X_{C2}= X_{C1}/2$ $Y_{C2}= Y_{C1}/2$

A2(-16;4.8), B2(-19.4;9.25), C2(-22.6;-1.45)

Answer: (-16; 4.8), (-19.4; 9.25), (-22.6; -1.45)