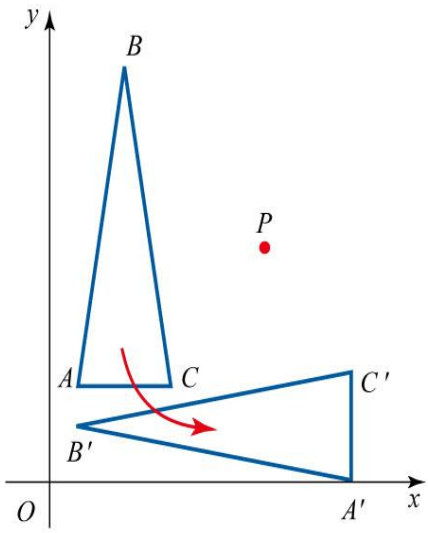
1. Prove that the following transformation T is linear.

$$T(x, y) = (x - y, 3x)$$

2. (a) Determine the matrix that defines a rotation of points in a plane through an angle θ about a point $P(h. k)$.

   (b) Use this general result to find the matrix that defines a rotation of the points through an angle of $\pi/2$ about the point (5, 4). Find the image of the triangle having the following vertices $A(1, 2)$, $B(2, 8)$, and $C(3, 2)$ under this rotation. See Figure 2.23.



Rotation about P

Figure

3. Draw a flow chart to illustrate generation of the following figure

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