

# Euclidean Vector Space (1A)

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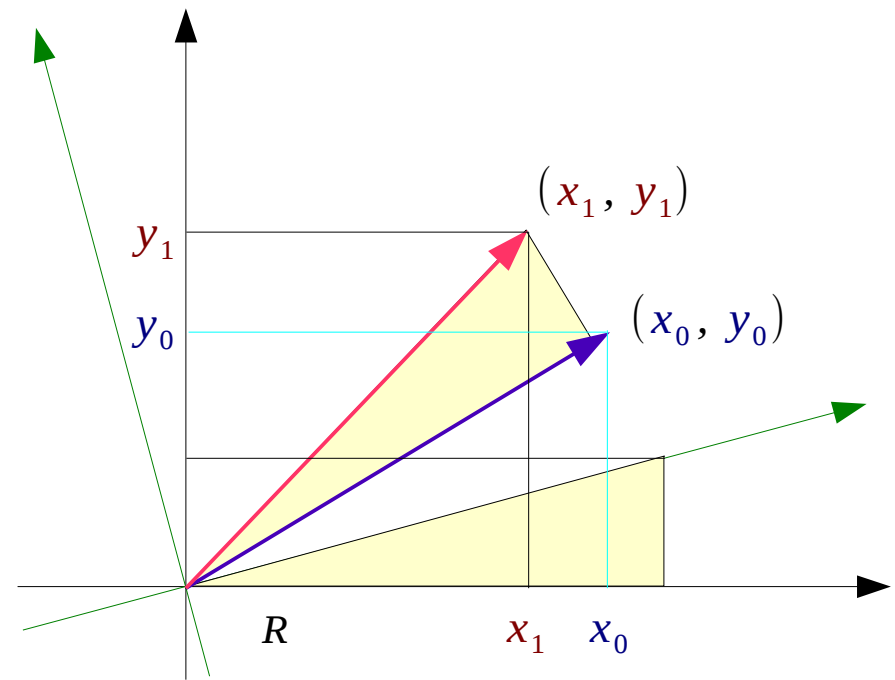
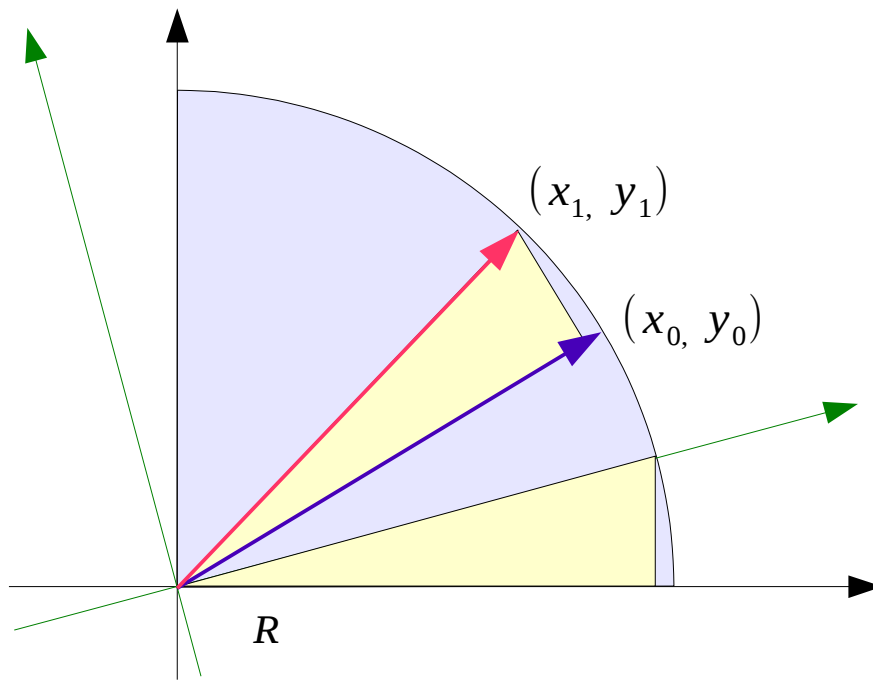
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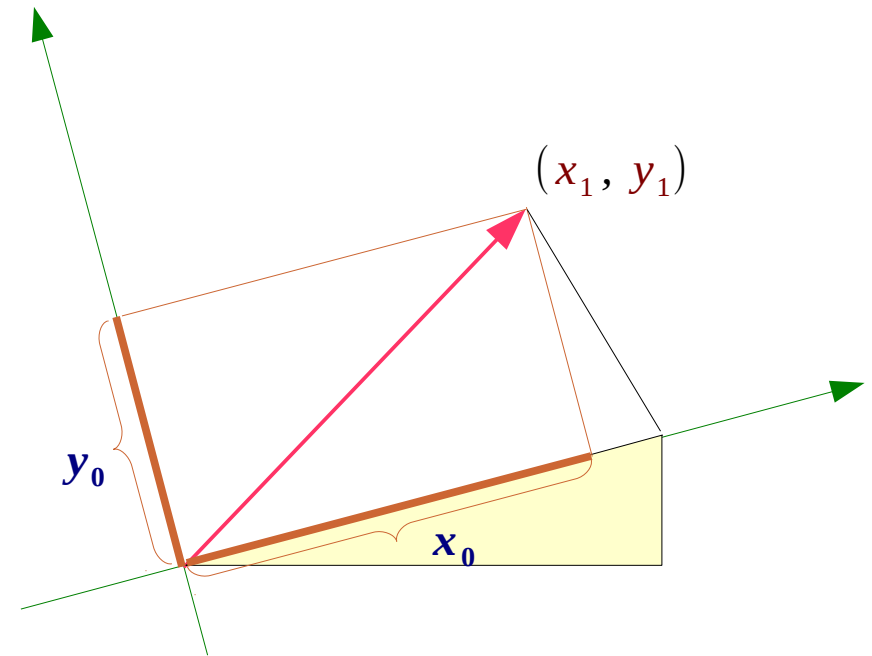
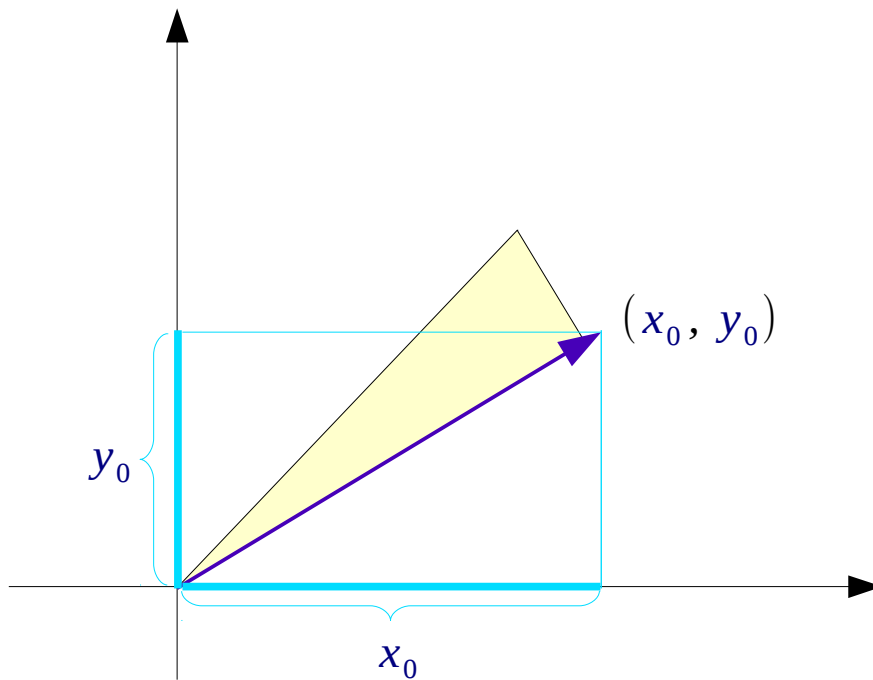
# Vector Rotation (1)



$$x_1 = x_0 \cos \theta - y_0 \sin \theta$$

$$y_1 = x_0 \sin \theta + y_0 \cos \theta$$

# Vector Rotation (2)

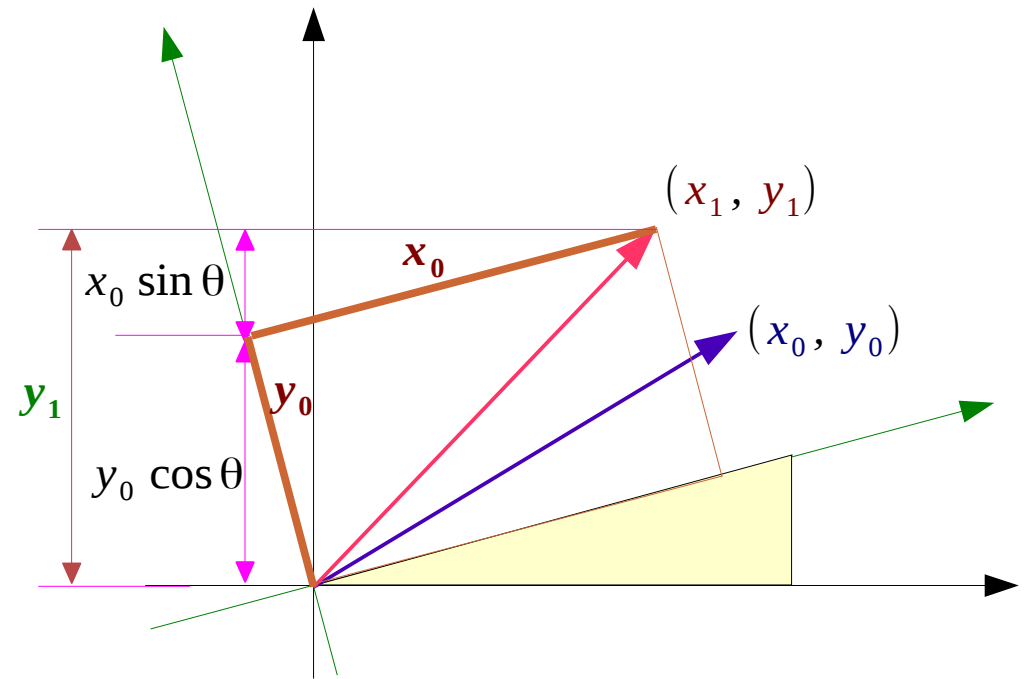
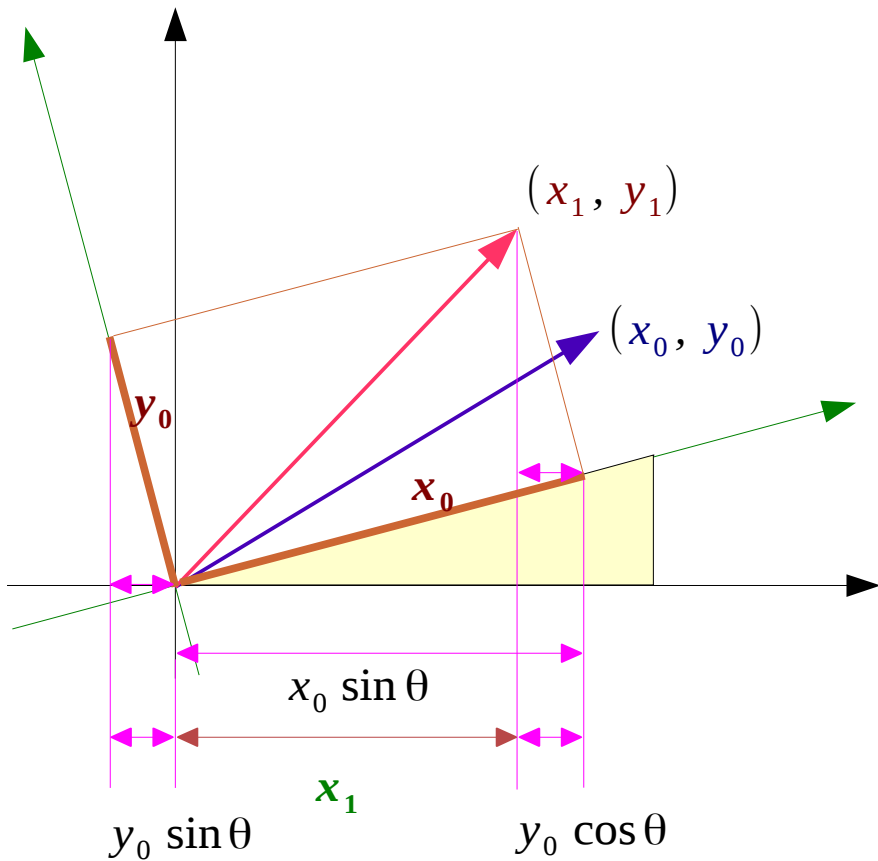


In the rotated  
coordinate  
invariant  $x_0, y_0$   
length

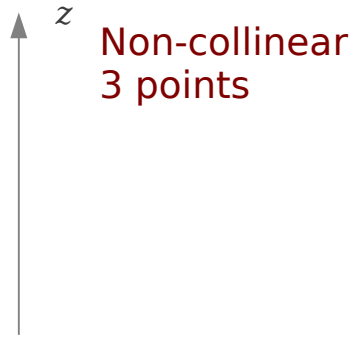
# Vector Rotation (3)

$$x_1 = x_0 \cos \theta - y_0 \sin \theta$$

$$y_1 = x_0 \sin \theta + y_0 \cos \theta$$



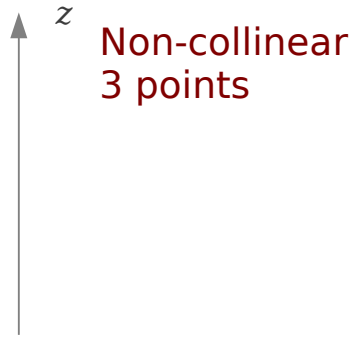
# Normal Vector & 3 Points



$$\mathbf{a} \times \mathbf{b} = \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \end{vmatrix} = \mathbf{i} \begin{vmatrix} a_2 & a_3 \\ b_2 & b_3 \end{vmatrix} - \mathbf{j} \begin{vmatrix} a_1 & a_3 \\ b_1 & b_3 \end{vmatrix} + \mathbf{k} \begin{vmatrix} a_1 & a_2 \\ b_1 & b_2 \end{vmatrix}$$

# Normal Vector & 3 Points

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## References

- [1] <http://en.wikipedia.org/>
- [2] <http://planetmath.org/>
- [3] M.L. Boas, “Mathematical Methods in the Physical Sciences”
- [4] D.G. Zill, “Advanced Engineering Mathematics”