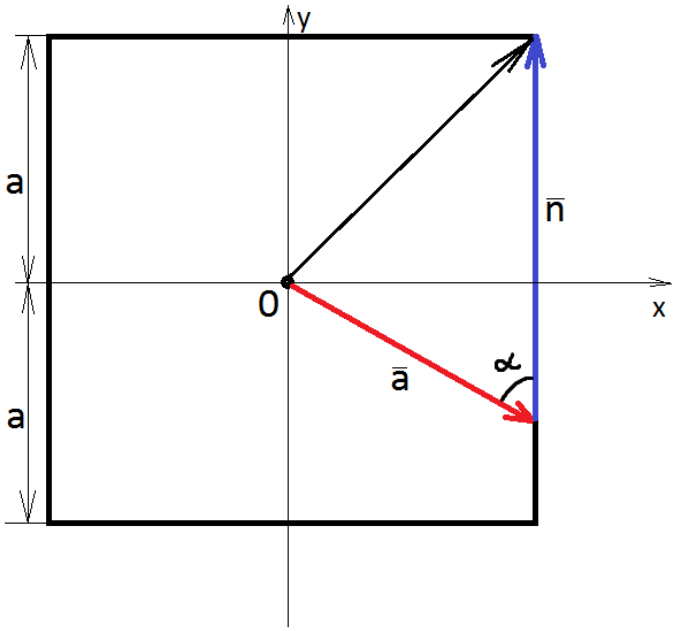
a square is there of side 2a, a vector from centre is pointing at an angle to one of its side, n reflects back to a corner of same side. Find these two vectors.

Solution:



We can introduce the X and Y-axis, which start from the center of the square.

Vector $\vec{a}$:

$$x_a = a; y_a = \frac{a}{\tan\alpha}; |\vec{a}| = \sqrt{a^2 + \left(\frac{a}{\tan\alpha}\right)^2} = a\sqrt{1 + \frac{1}{\tan\alpha}}$$

$$\vec{a} = \left\{a, \frac{a}{\tan\alpha}\right\}$$

Vector $\vec{n}$:

$$x_n = 0; y_n = \frac{a}{\tan\alpha} + a = \frac{a(1+\tan\alpha)}{\tan\alpha}; |\vec{n}| = \frac{a(1+\tan\alpha)}{\tan\alpha}$$

$$\vec{n} = \left\{0, \frac{a(1+\tan\alpha)}{\tan\alpha}\right\}$$

Answer:

$$\vec{a} = \left\{a, \frac{a}{\tan\alpha}\right\}$$

$$\vec{n} = \left\{0, \frac{a(1+\tan\alpha)}{\tan\alpha}\right\}$$