Problem 7.4.2

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Question

Question: if**A** and **B** are points in the plane such that $\frac{PA}{PB} = K(\text{constant})$ for all **P** on a given circle , then the value of K cannot be equal to .

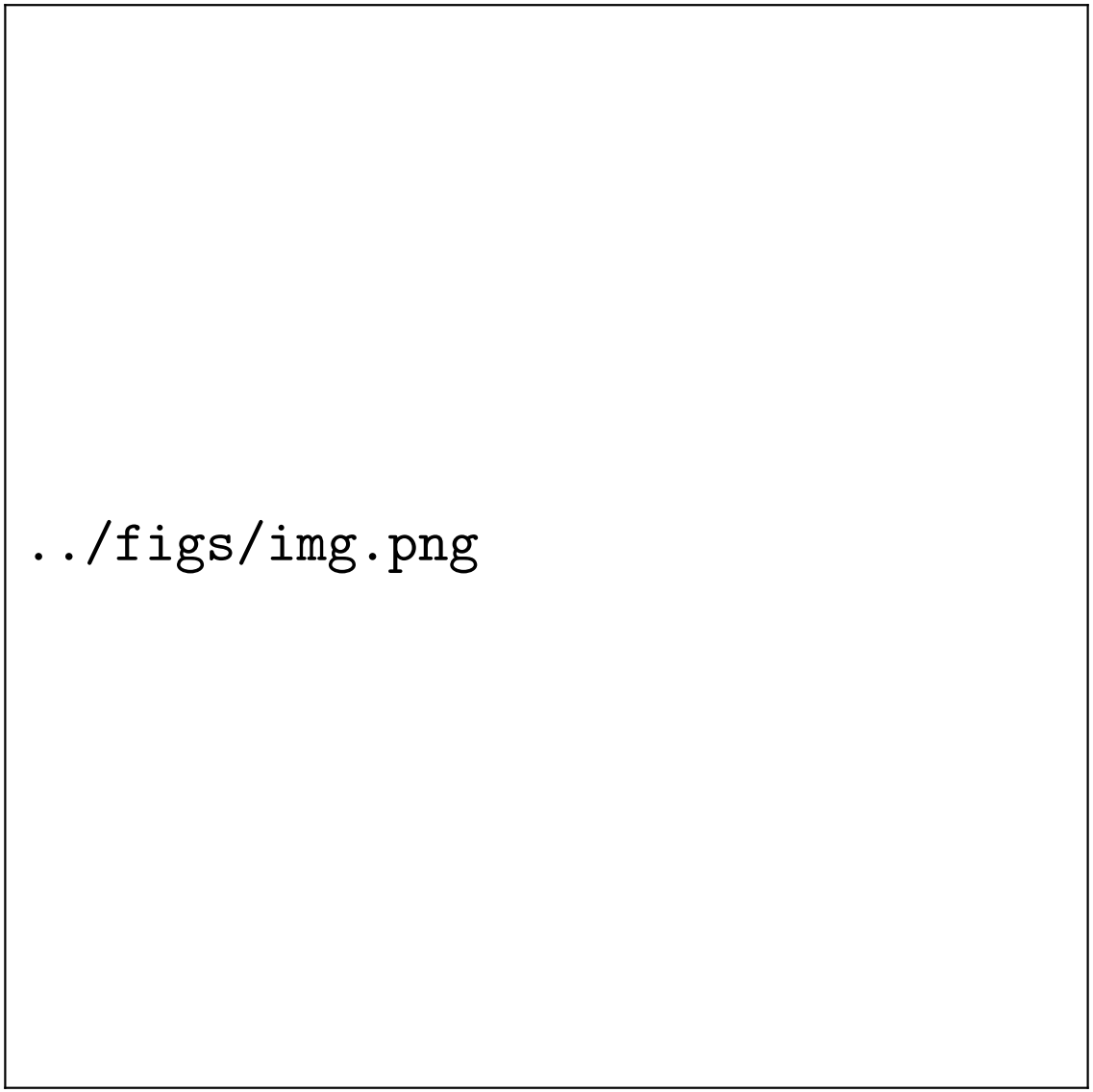
Solution

SOLUTION K$\neq$ 1,
IF K=1 then the locus of the position vector **P** is the line which bisect the join of two position vector **A** and **B**.
in other cases we always got a Apollonius circle where the value of k $\neq$1 .
for plotting purpose we are taking

$$\mathbf{A} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 2 \\ 0 \end{pmatrix}$$

the line is :

$$\begin{pmatrix} 1 & 0 \end{pmatrix} \mathbf{x} = 1.$$


../figs/img.png

C Code

```c
#include <stdio.h>

int main() {
    // Rectangle vertices
    int Ax = 0, Ay = 0;
    int Bx = 0, By = 5;
    int Cx = 3, Cy = 5;
    int Dx = 3, Dy = 0;
```

C Code

```
      printf("Coordinates of the rectangle are:\n");
    printf("A(%d, %d)\n", Ax, Ay);
    printf("B(%d, %d)\n", Bx, By);
    printf("C(%d, %d)\n", Cx, Cy);
    printf("D(%d, %d)\n", Dx, Dy);

    return 0;
}
```

Python Code for Plotting

```
import numpy as np
import matplotlib.pyplot as plt
from line.funcs import *
# from triangle.funcs import *
# from conics.funcs import circ_gen
# if using termux
import subprocess
import shlex
# end if
```

Python Code for Plotting

Python Code for Plotting

```
# Rectangle vertices
A = np.array([0,0]).reshape(-1,1)
B = np.array([0,5]).reshape(-1,1)
C = np.array([3,5]).reshape(-1,1)
D = np.array([3,0]).reshape(-1,1)

coords = np.block([[A,B,C,D]])
# Generate only rectangle sides
AB = line_gen(A,B)
BC = line_gen(B,C)
CD = line_gen(C,D)
DA = line_gen(D,A)
```

Python Code for Plotting

```
# Plot sides
plt.plot(AB[0,:],AB[1,:], label='AB')
plt.plot(BC[0,:],BC[1,:], label='BC')
plt.plot(CD[0,:],CD[1,:], label='CD')
plt.plot(DA[0,:],DA[1,:], label='DA')
# Scatter points
plt.scatter(coords[0,:],coords[1,:])
plt.text(A[0],A[1],"A(0,0)")
plt.text(B[0],B[1],"B(0,5)")
plt.text(C[0],C[1],"C(3,5)")
plt.text(D[0],D[1],"D(3,0)")
```

Python Code for Plotting

```
plt.xlabel('$x$')
plt.ylabel('$y$')
plt.legend(loc='best')
plt.grid(True)
plt.axis('equal')

plt.savefig('../figs/img.png')
plt.show()
```