**PRACTICAL NO:-5**

**PYTHON PROGRAM FOR ROTATION, REFLECTION OF LINE SEGEMNT, MIDPOINT, AND INTERSECTION OF LINES.**

**NAME:- ROLL.NO:-**

**Q.1 Rotate the line by 30® having two point (0,0) & (0,1) Also find equation after applying rotaion.**

from sympy import\*

x,y=symbols('x y'from sympy import\*

x,y=symbols('x y')

line=Line(Point(0,0),Point(0,1))

transline=line.rotate(30\*pi/180)

print("Equation of given line ->")

print(line.equation())

print("Equation of Transformed line->")

print(transline.equation()))

line=Line(Point(0,0),Point(0,1))

transline=line.rotate(30\*pi/180)

print("Equation of given line ->")

print(line.equation())

print("Equation of Transformed line->")

print(transline.equation())

**OUTPUT:-**

**Equation of given line -> x**

**Equation of Transformed line-> -sqrt(3)\*x/2 - y/2**

**Q.2 Rotate the segment by 180degree having end point (1,0) & (2,-1)**

from sympy import\*

seg=Segment2D(Point2D(1,0),Point2D(2,-1))

seg.rotate(180\*pi/180)

**OUTPUT:-**

**Segment2D(Point2D(−1,0),Point2D(−2,1)**

**Q.3 Rotate the segment by 90degree having starting point (0,0)&(4,4).**

from sympy import\*

ray=Ray(Point(0,0),Point(4,4))

Ray2D(Point2D(0,0),Point2D(4,4))

ray.rotate(90\*pi/180)

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 Ray2D(Point2D(0,0),Point2D(−4,4))**

**Q.4 Reflect the line 4x+3y=5 throught line x+y=0 and find the equation of reflected line.**

from sympy import\*

from numpy import\*

x,y=symbols('x y')

line=Line(4\*x+3\*y-5)

Line2D(Point2D(0,5/3),Point2D(1,1/3))

TransLine=line.reflect(Line(x+y))

TransLine=Line2D(Point2D(-5/3,0),Point2D(-1/3,-1))

line.equation()

**OUTPUT:**

**4*𝑥*3/+*𝑦*−5/3**

**Q.5 Reflect the line segment having starting point (0,0) in the direaction (2,4) throught line x-2y=3.**

from sympy import\*

from numpy import\*

x,y=symbols('x y')

seg=Segment(Point(0,0),Point(2,4))

seg=Segment2D(Point2D(0,0),Point2D(2,4))

seg.reflect(Line(x-2\*y-3))

**output:-**

**Segment2D(Point2D(65,−125),Point2D(285,−165))**

**Q.6 if the two line 2x+y=0 and x-3y=1 are transformed using the transformation matrix [T]=([2,-3],[1,-1])**

line1=Line(2\*x+y)

line2=Line(x-3\*y-1)

line1.intersection(line2)

p=Point(1/7,-2/7)

p.transform(Matrix([[2,-3,0],[1,-1,0],[0,0,1]]))

Point2D(0,-1/7)

**OUTPUT:-**

**Point2D(0,−17)**

**Q.7 if the segment joinig the point A[2 5] and B[4 -13] is transformed to the line segment A\* B\* by the transformation matrix [T]=([2,3],[1,1]) then find the midpoint of A\* B\*.**

A=Point2D(2,5)

B=Point2D(4,-13)

A1=A.transform(Matrix([[2,3,0],[4,1,0],[0,0,1]]))

B1=B.transform(Matrix([[2,3,0],[4,1,0],[0,0,1]]))

print(A1)

print(B1)

**OUTPUT:-**

**Point2D(24, 11)**

**Point2D(-44, -1)**

A=Point(2,5)

B=Point(4,-13)

A1=Point(24,11)

B1=Point(-44,-1)

transeg=Segment(A1,B1)

Segment2D(Point2D(24,11),Point2D(-44,-1))

transeg.midpoint

**OUTPUT:-**

**Point2D(−10,5)**