

In [1]:

```
# Practical no.8:Polygon
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# Rollno: 10
```

In [2]:

```
from sympy import *
from math import *
```

In [3]:

```
#Q1)Drawn a polygon with vertices (0,0),(1,0),(2,2),(1,4) and find its area and perimeter
```

In [4]:

```
A=Point(0,0)
B=Point(1,0)
C=Point(2,2)
D=Point(1,4)
P=Polygon(A,B,C,D)
P.area
```

Out[4]:

4

In [5]:

```
P.perimeter
```

Out[5]:

$1 + \sqrt{17} + 2\sqrt{5}$

In [6]:

```
#Q2)Drawn a regular polygon with 8 sides and radius 5 centered at origin and find its are
#perimeter
```

In [7]:

```
P=Polygon((0,0),5,n=8)
P.area
```

Out[7]:

$$\frac{400 - 200\sqrt{2}}{-4 + 4\sqrt{2}}$$

In [8]:

```
P.perimeter
```

Out[8]:

$40\sqrt{2 - \sqrt{2}}$

In [9]:

#Q3) Draw a regular polygon with 6 sides and radius 1 centered at (1,2) and find its area and perimeter

In [10]:

```
P=Polygon((1,2),1,n=6)
P.area
```

Out[10]:

$$\frac{3\sqrt{3}}{2}$$

In [11]:

P.perimeter

Out[11]:

6

In [12]:

```
#Q4) Draw a regular polygon with 7 sides and radius 1.5 centered at (2,2) and reflect it
#Line x-y=5
```

In [16]:

```
x,y=symbols('x,y')
P=Polygon((2,2),1.5,n=7)
P.reflect(Line(x-y-5))
```

Out[16]:

$$\text{RegularPolygon}\left(\text{Point2D}(7, -3), -1.5, 7, \frac{3\pi}{14}\right)$$

In [17]:

*#Q5) Drawn a polygon with vertices  $(0,0), (2,0), (2,3), (1,6)$  and rotate by 180 degrees and #angle at each vertex.*

In [18]:

```
A=Point(0,0)
B=Point(2,0)
C=Point(2,3)
D=Point(1,6)
P=Polygon(A,B,C,D)
P.rotate(pi)
```

Out[18]:

[illegible]



In [19]:

```
#Q6)Reflect the pol ABC through the line y=3 where A(1,0) ,B(2,-1),C(-1,3)
```

In [20]:

```
x,y=symbols('x,y')
A=Point(1,0)
B=Point(2,-1)
C=Point(-1,3)
T=Triangle(A,B,C)
P=Point(0,3)
Q=Point(1,3)
L=Line(P,Q)
T.reflect(L)
```

Out[20]:

Triangle(Point2D(1, 6), Point2D(2, 7), Point2D(-1, 3))

In [21]:

```
#Q7)Rotate the triangle ABC by 90 degree,where A(1,2),B(2,-2),C(-1,2)
```

In [22]:

```
x,y=symbols('x,y')
A=Point(1,2)
B=Point(2,-2)
C=Point(-1,2)
T=Triangle(A,B,C)
T.rotate(pi/2)
```

Out[22]:

Triangle(Point2D(-2, 1), Point2D(2, 2), Point2D(-2, -1))

In [23]:

```
#Q8)Find the area perimeter of the triangle ABC where A(0,0),B(5,0),C(3,3)
```

In [24]:

```
x,y=symbols('x,y')
A=Point(0,0)
B=Point(5,0)
C=Point(3,3)
T=Triangle(A,B,C)
T.area
```

Out[24]:

$$\frac{15}{2}$$



In [25]:

```
T.perimeter
```

Out[25]:

$$\sqrt{13} + 3\sqrt{2} + 5$$

In [26]:

```
#Q9)Find the angle at each vertices of the triangle ABC,where A(0,0),B(2,2) and C(0,2)
```

In [28]:

```
x,y=symbols('x,y')
A=Point(0,0)
B=Point(2,2)
C=Point(0,2)
T=Triangle(A,B,C)
T.angles[A]
```

Out[28]:

$$\frac{\pi}{4}$$



In [29]:

```
T.angles[B]
```

Out[29]:

$$\frac{\pi}{4}$$



In [30]:

```
T.angles[C]
```

Out[30]:

$$\frac{\pi}{2}$$



In [ ]: