```
In [ ]:  Name -Tej Sutar
         roll no -176
         std = sy bsc cs
         batch =h
         date=18/1/25
         practical no 7 and 8=8: Study of Graphical aspects of Three dimensional transfor
```

```
In [ ]:  1) Write a Python program to draw a polygon with vertices (0,0),(2,0),(2,3) and
```

```
In [17]:  from sympy import*
          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[17]:


```
In [ ]:  2) Using sympy declare the points A(0,2),B(5,2),C(3,0) check whether these point
         the line passing through the points A and B, find the distance of this line from
```

```
In [21]:  from sympy import*
          A=Point(0,2)
          B=Point(5,2)
          C=Point(3,0)
          Point.is_collinear(A,B,C)
```

Out[21]: False

```
In [23]:  A=Point(0,2)
          B=Point(5,2)
          L=Line(A,B)
          L.equation()
```

Out[23]: $y - 2$

```
In [25]:  C=Point(3,0)
          L.distance(C)
```

Out[25]: 2

```
In [ ]:  3) If the line with points A[2,1],B[4,-1] is transformed by the transformation m
         line.
```

```
In [29]:  from sympy import*
          A=Point(2,1);B=Point(4,-1)
          A1=A.transform(Matrix([[1,2,0],[2,1,0],[0,0,1]]))
          B1=B.transform(Matrix([[1,2,0],[2,1,0],[0,0,1]]))
          L=Line(A1,B1)
          L.equation()
```

Out[29]: $-2x - 2y + 18$

In [ ]:
```
4) Write a python program to drawn a polygon with vertices (0,0),(1,0),(2,2),(1,
```

In [34]:
```
from sympy import*
A,B,C,D=[(0,0),(1,0),(2,2),(1,4)]
p=Polygon(A,B,C,D)
P.area
```

Out[34]: $\dfrac{15}{2}$

In [36]:
```
P.perimeter
```

Out[36]: $\sqrt{10} + 5 + \sqrt{37}$

In [ ]:
```
5) Write a python program to plot triangle with vertices [3,3],[5,6],[5,2], and
by angle -π radians.
```

In [60]:
```
from sympy import*
A,B,C=[(3,3),(5,6),(5,2)]
T=Triangle(A,B,C)
T
```

Out[60]:

In [42]:
```
T.rotate(-pi)
```

Out[42]:

In [ ]:
```
6) Using python, generate triangle with vertices (0,0),(4,0),(2,4), check whethe
```

In [44]:
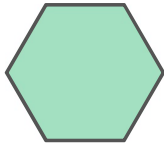```
T=Triangle(Point(0,0),Point(4,0),Point(2,4))
T.is_isosceles()
```

Out[44]: True

In [ ]:
```
7) Write a python program to draw a polygon with 6 sides and radius 1 centered a
```

In [50]:
```
from sympy import*
P=Polygon((1,2),1,n=6)
P
```

Out[50]:



In [52]: `P.area`

Out[52]: $\dfrac{3\sqrt{3}}{2}$

In [54]: `P.perimeter`

Out[54]: 6

In [ ]: 8) Write a Python program to find the area **and** perimeter of the triangle ABC, wh

In [62]:
```python
from sympy import*
A,B,C=[(0,0),(5,0),(3,3)]
T=Triangle(A,B,C)
T
```

Out[62]:

In [64]: `T.area`

Out[64]: $\dfrac{15}{2}$

In [66]: `T.perimeter`

Out[66]: $\sqrt{13} + 3\sqrt{2} + 5$

In [ ]: 9) Write a python program to reflect the ΔABC through the line y = 3 where A(1,0

In [72]:
```python
from sympy import*
A=Point(1,0);B=Point(2,-1);C=Point(-1,3)
T=Triangle(A,B,C)
x,y=symbols('x,y')
T.reflect(Line(y-3))
```

Out[72]:

In [ ]: 10) Find the angle at each vertices of the triangle ABC ,where A[0,0],B[2,2],C[0

In [74]:
```python
from sympy import*
A=Point(0,0);B=Point(2,2);C=Point(0,2)
```

```
T=Triangle(A,B,C)
T.angles[A]
```

Out[74]: $\dfrac{\pi}{4}$

In [76]:
```
T.angles[B]
```

Out[76]: $\dfrac{\pi}{4}$

In [78]:
```
T.angles[C]
```

Out[78]: $\dfrac{\pi}{2}$

```
T=Triangle(A,B,C)
T.angles[A]
```