In [ ]:
```
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roll no -115 std = sy
bsc cs batch =f
date=18/1/25
practical no 7 and 8=8: Study of Graphical aspects of Three dimensional transfor
```
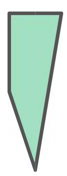

```
In [ ]: 1) Write a Python program to draw a polygon with vertices (0,0),(2,0),(2,3) and
```

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 linefrom
```

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.
```

2

In [29]:

Out[60]:

```
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]: -

In [36]:

```
P.perimeter
```

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

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

In [34]:

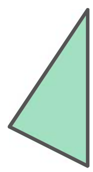
In [ ]: 5) Write a python program to plot triangle with vertices [3,3],[5,6],[5,2], and by angle $-\pi$ radians.

```
p=Polygon(A,B,C,D)
```

In [60]:

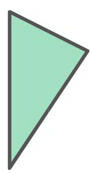
```
from sympy import*
A,B,C=[(3,3),(5,6),(5,2)]
T=Triangle(A,B,C)
T
```

Out[34]:



In [42]:

```
T.rotate(-pi)
```



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()
```

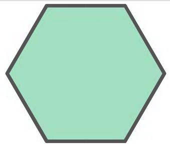
Out[44]: True

Out[42]:

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
```

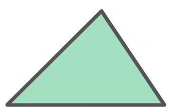
Out[52]: $\frac{3\sqrt{3}}{2}$

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



Out[62]:

In [64]:
```
T.area
```

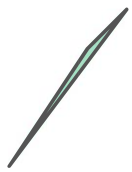
Out[64]: $\overline{2}^{15}$

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]:
```
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))
```



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

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

Out[72]:

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

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

In [76]:

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

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

In [78]:

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

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

Out[74]:

Out[76]:

Out[78]: