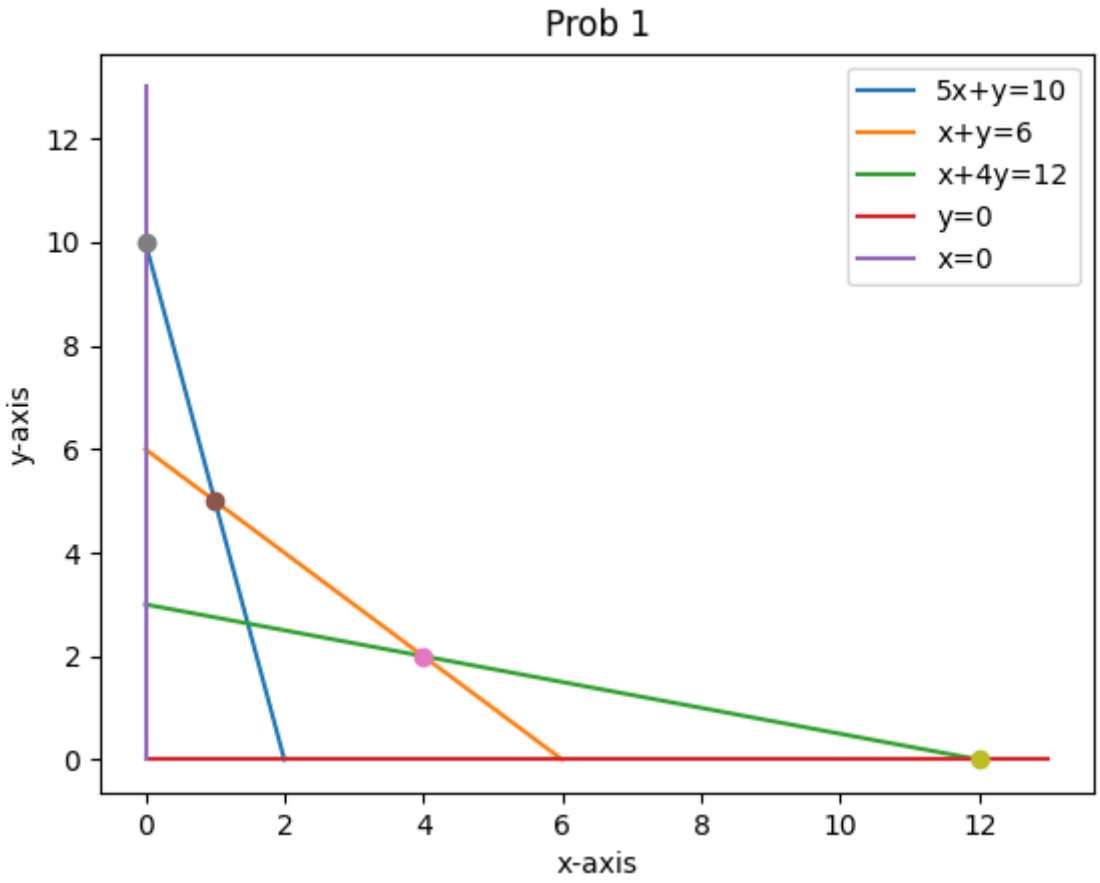
Code:

```
from shapely.geometry import LineString
from matplotlib import pyplot as plt
import numpy as np

# Plot lines
x = [0, 2]
y = [10, 0]

plt.plot(x, y)

x = [0, 6]
y = [6, 0]

plt.plot(x, y)

x = [0, 12]
y = [3, 0]

plt.plot(x, y)

x = [0, 13]
y = [0, 0]

plt.plot(x, y)

x = [0, 0]
y = [0, 13]

plt.plot(x, y)

# Labels
plt.legend(["5x+y=10", "x+y=6", "x+4y=12", "y=0", "x=0"])
plt.xlabel('x-axis')
plt.ylabel('y-axis')
plt.title('Prob 1')

# define lines calculate inersection points
l1 = LineString([(2, 0), (0, 10)])
l2 = LineString([(6, 0), (0, 6)])
l3 = LineString([(12, 0), (0, 3)])
i1 = l1.intersection(l2)
i2 = l2.intersection(l3)

# plot and print intersection points
plt.plot(*i1.xy, 'o')
plt.plot(*i2.xy, 'o')
plt.plot(0, 10, 'o')
plt.plot(12, 0, 'o')
```

```
prn = f"Intersection points are: \nA({i1.xy[0][0]}, {i1.xy[1][0]})
\nB({i2.xy[0][0]}, {i2.xy[1][0]}) \nC(0, 10) \nD(12, 0)"
print(prn)

# Show result
plt.show()
```

Outputs:

```
❯ python prob_1.py
Intersection points are:
A(1.0, 5.0)
B(4.0, 2.0)
C(0, 10)
D(12, 0)
```



Code:

```
from shapely.geometry import LineString
from matplotlib import pyplot as plt
import numpy as np

# Plot lines
x = [0, 250]
y = [500, 0]

plt.plot(x, y)

x = [150, 150]
y = [0, 500]

plt.plot(x, y)

x = [0, 500]
y = [250, 250]

plt.plot(x, y)

x = [0, 500]
y = [0, 0]

plt.plot(x, y)

x = [0, 0]
y = [0, 500]

plt.plot(x, y)

# Labels
plt.legend(["2x+y <= 500", "x <= 150", "y <= 250", "y = 0", "x = 0"])
plt.xlabel('x-axis')
plt.ylabel('y-axis')
plt.title('Prob 2')

# define lines calculate inersection points
l1 = LineString([(250, 0), (0, 500)])
l2 = LineString([(150, 0), (150, 500)])
l3 = LineString([(0, 250), (500, 250)])
i1 = l1.intersection(l2)
i2 = l2.intersection(l3)
i3 = l3.intersection(l1)

# plot and print intersection points
plt.plot(*i1.xy, 'o')
plt.plot(*i2.xy, 'o')
plt.plot(*i3.xy, 'o')
plt.plot(0, 250, 'o')
```

```
plt.plot(150, 0, 'o')

prn = f"Intersection points are: \nA({i1.xy[0][0]}, {i1.xy[1][0]})
\nB({i2.xy[0][0]}, {i2.xy[1][0]}) \nC({i3.xy[0][0]}, {i3.xy[1][0]}) \nD(0,
250) \nE(150, 0)"
print(prn)

# shade solution region
x = [0, i3.xy[0][0], i1.xy[0][0], 150]
y = [250, i3.xy[1][0], i1.xy[1][0], 0]
plt.fill_between(x, y, color='blue', alpha=0.2)

# Show result
plt.show()
```

Outputs:

```
❯ python prob_2.py
Intersection points are:
A(150.0, 200.0)
B(150.0, 250.0)
C(125.0, 250.0)
D(0, 250)
E(150, 0)
```