Assignment 2

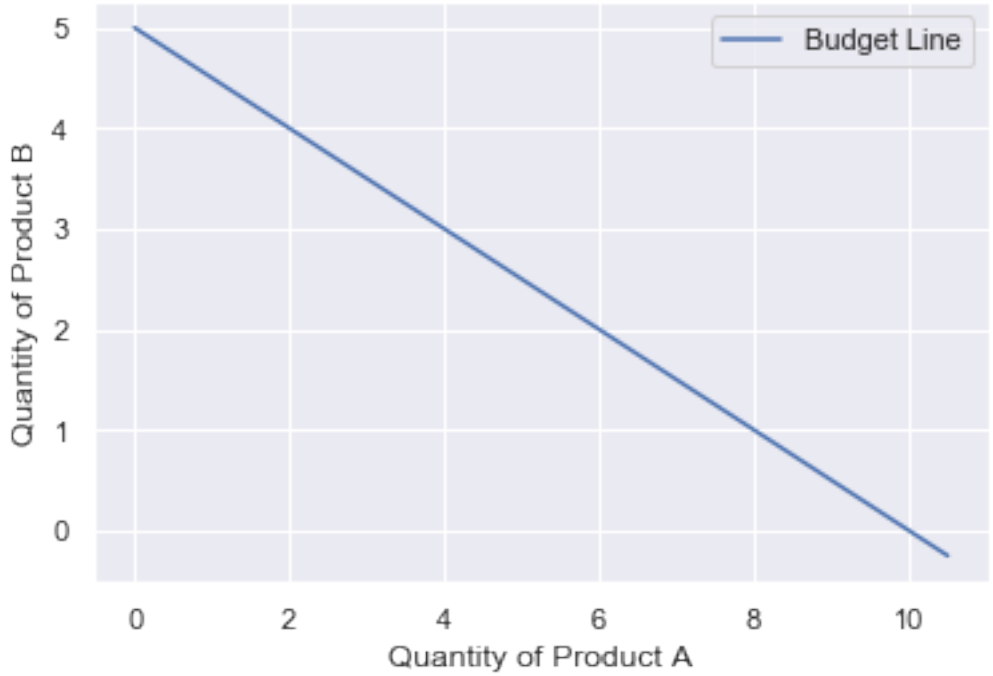
December 8, 2018

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
sns.set()
```

In [2]:
```
Income = 200
Pa = 20
Pb = 40
Qa = np.arange(0,11,0.5)
Qb = ((Income)/(Pb)) - ((Pa*Qa)/(Pb))
df = pd.DataFrame(list(zip(Qa,Qb)), columns=['Quantity of Product A', 'Quantity of Proc
print(df)
```

	Quantity of Product A	Quantity of Product B
0	0.0	5.00
1	0.5	4.75
2	1.0	4.50
3	1.5	4.25
4	2.0	4.00
5	2.5	3.75
6	3.0	3.50
7	3.5	3.25
8	4.0	3.00
9	4.5	2.75
10	5.0	2.50
11	5.5	2.25
12	6.0	2.00
13	6.5	1.75
14	7.0	1.50
15	7.5	1.25
16	8.0	1.00
17	8.5	0.75
18	9.0	0.50
19	9.5	0.25
20	10.0	0.00
21	10.5	-0.25

In [3]:
```
plt.plot(df['Quantity of Product A'], df['Quantity of Product B'])
plt.xlabel('Quantity of Product A')
plt.ylabel('Quantity of Product B')
plt.legend(['Budget Line'])
plt.show()
```



In [4]:
```
x = np.arange(1, 10.1, 0.1)
indifference_curve = lambda x: 25/(2*x)
df['Indifference Curve'] = indifference_curve(df['Quantity of Product A'])
print(df)
```

	Quantity of Product A	Quantity of Product B	Indifference Curve
0	0.0	5.00	inf
1	0.5	4.75	25.000000
2	1.0	4.50	12.500000
3	1.5	4.25	8.333333
4	2.0	4.00	6.250000
5	2.5	3.75	5.000000
6	3.0	3.50	4.166667
7	3.5	3.25	3.571429
8	4.0	3.00	3.125000
9	4.5	2.75	2.777778
10	5.0	2.50	2.500000
11	5.5	2.25	2.272727

12	6.0	2.00	2.083333
13	6.5	1.75	1.923077
14	7.0	1.50	1.785714
15	7.5	1.25	1.666667
16	8.0	1.00	1.562500
17	8.5	0.75	1.470588
18	9.0	0.50	1.388889
19	9.5	0.25	1.315789
20	10.0	0.00	1.250000
21	10.5	-0.25	1.190476

In [5]:
```
fig, ax = plt.subplots(ncols=2, nrows=1, figsize=(16,7))
ax[0].plot(df['Quantity of Product A'], df['Quantity of Product B'])
ax[0].plot(x, indifference_curve(x))
ax[0].scatter([5],indifference_curve(5), marker='x')
ax[0].set_xlabel('Quantity of Product A')
ax[0].set_ylabel('Quantity of Product B')
ax[0].legend(['Indifference Curve', 'Budget Line', 'Equilibrium point (Qa = 5, Qb = 2.5

ax[1].plot(df['Quantity of Product A'], df['Quantity of Product B'])
ax[1].plot(x, indifference_curve(x))
ax[1].scatter([5],indifference_curve(5), marker='x')
ax[1].set_xlabel('Quantity of Product A')
ax[1].set_ylabel('Quantity of Product B')
ax[1].legend(['Indifference Curve', 'Budget Line', 'Equilibrium point (Qa = 5, Qb = 2.5
ax[1].set_ylim(2,3)
ax[1].set_xlim(4,6)
plt.show()
```