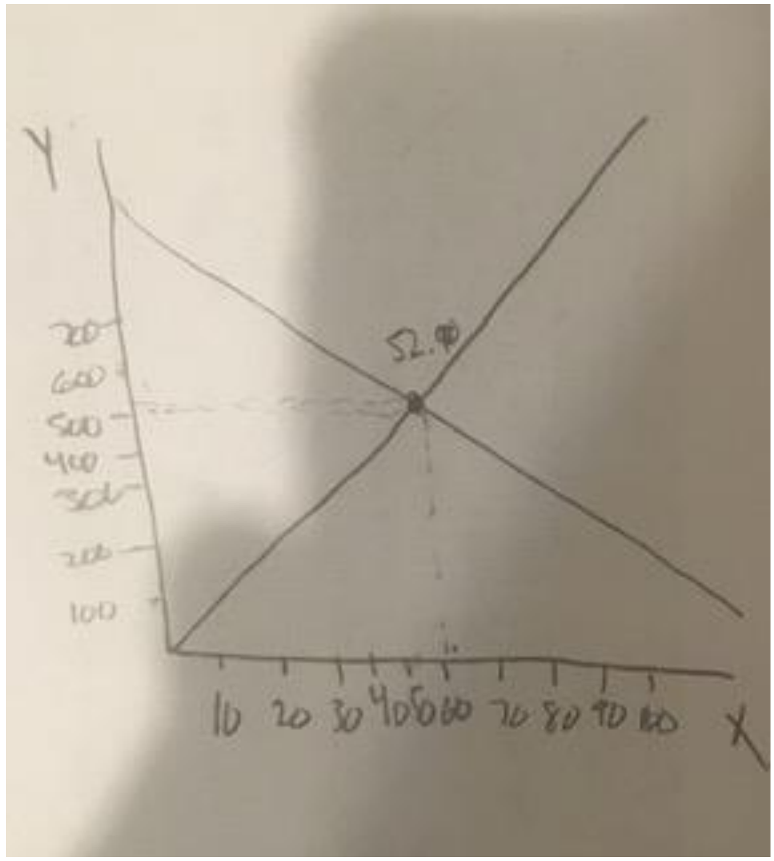
Supply & Demand Model

a.)

```
s=203+5.7*p
d=650-2.75*p

203+5.7*p=650-2.75*p

203+8.45*p=650

8.45*p=447

p=52.90

s=203+5.7(52.90)
s=504.43

d=650-2.75(52.90)
d=504.43

s=504.43=d
```

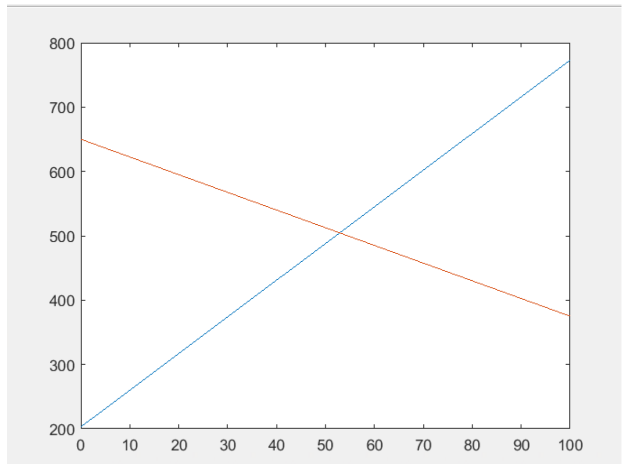


As shown above through the visual inspection graph and formulas, we can conclude that the economy is stable at the price point of $52.90.

b.)

```
>> syms p
>> solve(203+5.7*p==650-2.75*p)

ans =

8940/169

>> 8940/169

ans =

   52.8994

>> syms s d p
>> sol=solve(s==203+5.7*p,d==650-2.75*p,s==d)

sol =

  struct with fields:

    d: [1×1 sym]
    p: [1×1 sym]
    s: [1×1 sym]

>> sol.d

ans =

85265/169

>> 85265/169

ans =

  504.5266

>> sol.s

ans =

85265/169

>> 85265/169

ans =

  504.5266

>> sol.p

ans =

8940/169

>> 8940/169

ans =

   52.8994
```

```
>> x=0:100;
>> plot(x,203+5.7*x)
>> hold on
>> plot(x,650-2.75*x)
```



2 variables

a.)

$2x - 3y = 1$

$-4x + 8y = 4$

$E21(2)$

$2x - 3y = 1$

$0 + 2y = 6$

$E2(\frac{1}{2})$

$2x - 3y = 1$

$0 + 1y = 3$

$E12(3)$

$2x - 0 = 10$

$0 + 1y = 3$

$E1(\frac{1}{2})$

$1x - 0 = 5$

$0 + 1y = 3$

$x = 5$

$y = 3$

b.)

$2x - 3y = 5$

$3x - 8y = 4$

$E21(\frac{-3}{2})$

$2x - 3y = 5$

$0 - 3.5y = 3.5$

$E2(-\frac{1}{3.5})$

$2x - 3y = 5$

$0 + 1y = 1$

$E12(3)$

$2x - 0 = 8$

$0 + 1y = 1$

$E1(\frac{1}{2})$

$1x - 0 = 4$

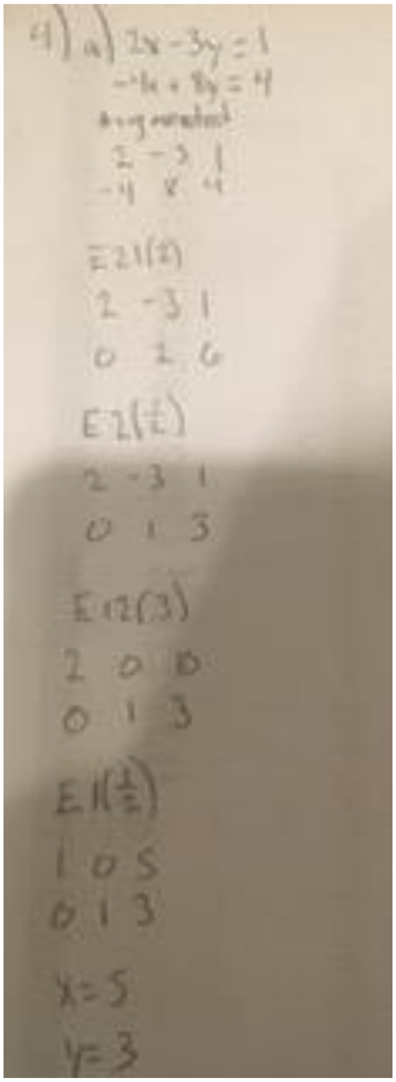
$0 + 1y = 1$

$x = 4$

$y = 1$

2 variables - Augmented

a.)



4) a) $2x - 3y = 1$
$-4x + 8y = 4$
Augmented
$2 \quad -3 \quad 1$
$-4 \quad 8 \quad 4$

$E21(2)$
$2 \quad -3 \quad 1$
$0 \quad 2 \quad 6$

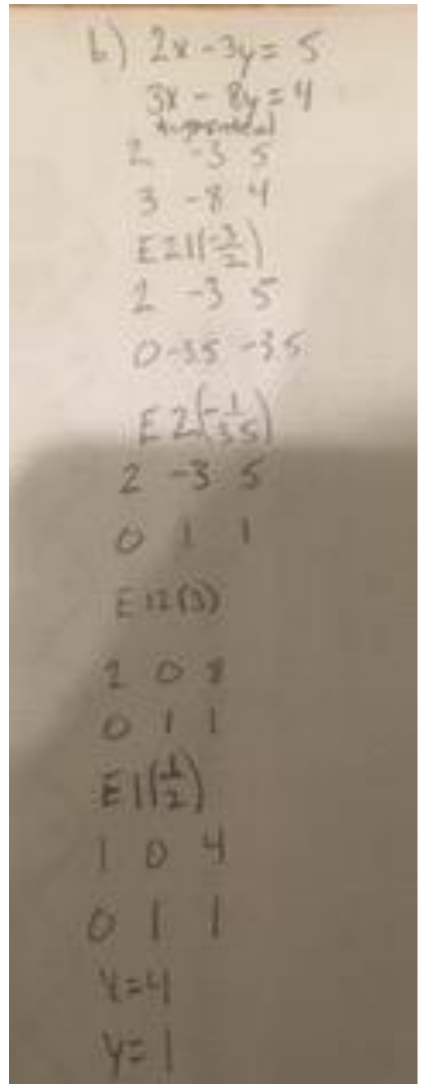
$E2(\frac{1}{2})$
$2 \quad -3 \quad 1$
$0 \quad 1 \quad 3$

$E12(3)$
$2 \quad 0 \quad 10$
$0 \quad 1 \quad 3$

$E1(\frac{1}{2})$
$1 \quad 0 \quad 5$
$0 \quad 1 \quad 3$

$x = 5$
$y = 3$

b.)



b) $2x - 3y = 5$
$3x - 8y = 4$
Augmented
$2 \quad -3 \quad 5$
$3 \quad -8 \quad 4$
$E21(-\frac{3}{2})$
$2 \quad -3 \quad 5$
$0 \quad -3.5 \quad -3.5$

$E2(-\frac{1}{3.5})$
$2 \quad -3 \quad 5$
$0 \quad 1 \quad 1$

$E12(3)$

$2 \quad 0 \quad 8$
$0 \quad 1 \quad 1$
$E1(\frac{1}{2})$
$1 \quad 0 \quad 4$
$0 \quad 1 \quad 1$
$x = 4$
$y = 1$

Back Substitution / Gauss Jordan / Gaussian

```
-2x + 6y   -3z     -w   =    8
      5y    +z    -6w   =    1
             z    +5w   =    2
                   4w   =    4
```

a.) augmented matrix M

```
-2 6 -3 -1 8
 0 5  1 -6 1
 0 0  1  5 2
 0 0  0  4 4
```

b.)

E4(1/4)
```
-2 6 -3 -1 8
 0 5  1 -6 1
 0 0  1  5 2
 0 0  0  1 1
```

E34(-5)
```
-2 6 -3 -1  8
 0 5  1 -6  1
 0 0  1  0 -3
 0 0  0  1  1
```

E24(6)
```
-2 6 -3 -1  8
 0 5  1  0  7
 0 0  1  0 -3
 0 0  0  1  1
```

E14(1)
```
-2 6 -3  0  9
 0 5  1  0  7
 0 0  1  0 -3
 0 0  0  1  1
```

E23(-1)
```
-2 6 -3  0  9
 0 5  0  0  10
 0 0  1  0 -3
 0 0  0  1  1
```

E13(3)
```
-2 6  0  0  0
 0 5  0  0  10
 0 0  1  0 -3
 0 0  0  1  1
```

E2(1/5)
```
-2 6  0  0  0
 0 1  0  0  2
 0 0  1  0 -3
 0 0  0  1  1
```

E12(-6)
```
-2 0  0  0 -12
 0 1  0  0  2
 0 0  1  0 -3
 0 0  0  1  1
```

E1(-1/2)
```
 1 0  0  0  6
 0 1  0  0  2
 0 0  1  0 -3
 0 0  0  1  1
```

c.)

x=6

y=2

z=-3

w=1

2 Variables / 2 Variables Augmented & Back Substitution / Gauss Jordan / Gaussian in Matlab

a.)

```
>> M(2,:)=M(2,:)*(1/2)

M =

     2    -3     1
     0     1     3

>> %E2(1/2)
>> M(2,:)=M(2,:)*(1/2)

M =

    2.0000   -3.0000    1.0000
         0    0.5000    1.5000

>>  M=[2 -3 1;-4 8 4]

M =

     2    -3     1
    -4     8     4

>> %E21(2)
>> M(2,:)=M(2,:)+2*M(1,:)

M =

     2    -3     1
     0     2     6

>> %E2(1/2)
>> M(2,:)=M(2,:)*(1/2)

M =

     2    -3     1
     0     1     3

>> %E12(3)
>> M(1,:)=M(1,:)+3*M(2,:)

M =

     2     0    10
     0     1     3

>> %E1(1/2)
>> M(1,:)=M(1,:)*(1/2)

M =

     1     0     5
     0     1     3
```

b.)

```
>> M=[2 -3 5;3 -8 4]

M =

     2    -3     5
     3    -8     4

>> %E21(2)
>> M(2,:)=M(2,:)-(3/2)*M(1,:)

M =

    2.0000   -3.0000    5.0000
         0   -3.5000   -3.5000

>> %E2(1/2)
>> M(2,:)=M(2,:)*(-1/3.5)

M =

     2    -3     5
     0     1     1

>> %E12(3)
>>  M(1,:)=M(1,:)+3*M(2,:)

M =

     2     0     8
     0     1     1

>> %E1(1/2)
>> M(1,:)=M(1,:)*(1/2)

M =

     1     0     4
     0     1     1

>> 
```

5.)

```
>>  M=[-2 6 -3 -1 8;0 5 1 -6 1;0 0 1 5 2;0 0 0 4 4]

M =

    -2     6    -3    -1     8
     0     5     1    -6     1
     0     0     1     5     2
     0     0     0     4     4

>> %E4(1/4)
>>  M(4,:)=M(4,:)*(1/4)

M =

    -2     6    -3    -1     8
     0     5     1    -6     1
     0     0     1     5     2
     0     0     0     1     1

>> %E34(-5)
>> M(3,:)=M(3,:)-5*M(4,:)

M =

    -2     6    -3    -1     8
     0     5     1    -6     1
     0     0     1     0    -3
     0     0     0     1     1

>> %E24(6)
>> M(2,:)=M(2,:)+6*M(4,:)

M =

    -2     6    -3    -1     8
     0     5     1     0     7
     0     0     1     0    -3
     0     0     0     1     1

>> %E14(1)
>> M(1,:)=M(1,:)+1*M(4,:)

M =

    -2     6    -3     0     9
     0     5     1     0     7
     0     0     1     0    -3
     0     0     0     1     1

>> %E23(-1)
>> M(2,:)=M(2,:)-1*M(3,:)

M =

    -2     6    -3     0     9
     0     5     0     0    10
     0     0     1     0    -3
     0     0     0     1     1

>> %E13(3)
>> M(1,:)=M(1,:)+3*M(3,:)

M =

    -2     6     0     0     0
     0     5     0     0    10
     0     0     1     0    -3
     0     0     0     1     1

>> %E2(1/5)
>> M(2,:)=M(2,:)*(1/5)

M =

    -2     6     0     0     0
     0     1     0     0     2
     0     0     1     0    -3
     0     0     0     1     1

>> %E12(-6)
>> M(1,:)=M(1,:)-6*M(2,:)

M =

    -2     0     0     0   -12
     0     1     0     0     2
     0     0     1     0    -3
     0     0     0     1     1

>> %E1(-1/2)
>> M(1,:)=M(1,:)*(-1/2)

M =

     1     0     0     0     6
     0     1     0     0     2
     0     0     1     0    -3
     0     0     0     1     1
```