**Question 1**

Let x be 27 inch tv sets

Let y be 20 inch tv

Maximize z=120x+80y

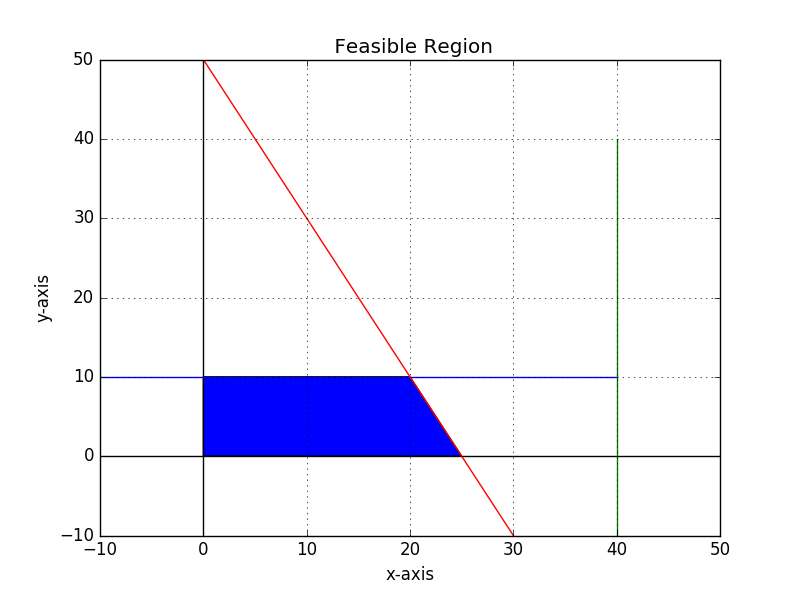
x 40

y

20x+10y 500

And x 0, y 0

b.



The maximux value is 3200 at point (20,10)

**Question 2a.**

# -\*- coding: utf-8 -\*-

import matplotlib.pyplot

from matplotlib.pyplot import \*

import numpy

from numpy import arange

figure()

#ax = add\_subplot(111)

x= arange(-1,10,1)

y= arange(-1,10,1)

y1= 27.0 - 3.0\*x

y2= 12.0-1.0\*x

y3=15.0 - 1.5\*x

#y1= 12.0 - 2.0\*x

#y2= 6.0 - 0.5\*x

xlabel('x1-axis')

ylabel('x2-axis')

title (' Feasible Region')

plot(x,y1,color='b')

plot(x,y2,color='r')

plot(x,y3,color='g')

legend(['0.3x1 + 0.1x2=2.7','0.5x1 + 0.5x2=6', '0.6x1+0.4x2=6'])

xlim(-1,10)

ylim(-1,10)

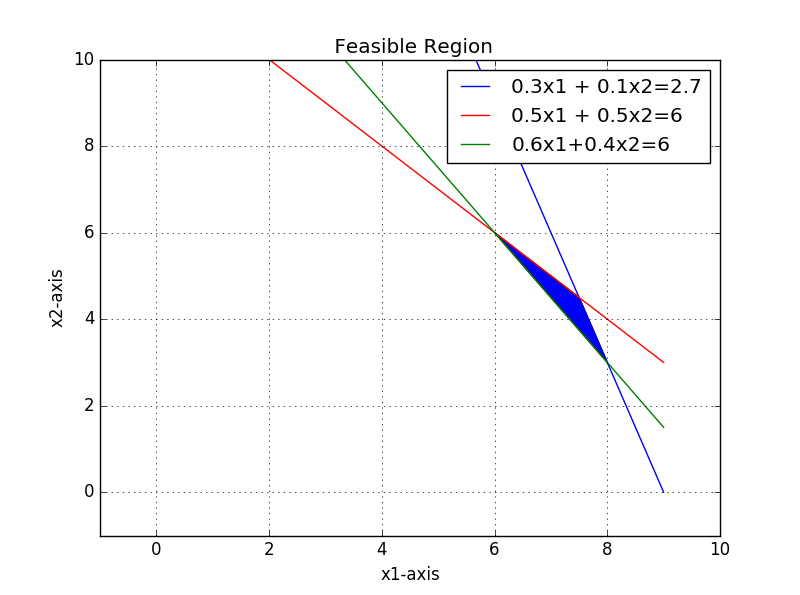
grid(True)

x= [6.0,7.5,8.0]

y= [6.0,4.5, 3.0]

fill(x,y)

show()



**Question 2b**

|  |  |  |
| --- | --- | --- |
| Corner Point | Value of z=0.4x1 +0.5x2 |  |
| (6,6) | 5.4 |  |
| (7.5,4.5) | 5.25 |  |
| (8,3) | 4.7 | Minimum |
|  |  |  |

The minimum dosage is 4.7 at point (8,3)

**Question 3**

=

Answer: When the demand is 2 the price drops by 30.

3b

Let (2x-3) =u

5

=5(-= 5\*(-= - -

Answer = - -

**Question 4.**

from math import \*

# -\*- coding: utf-8 -\*-

#The population of students at Northwestern is given by the formula

#p(t)=(𝑡t^2+100)∗ln (t𝑡+2) , where t represents the time in years since 2000.

#Using Python, find the rate of change of the student population in both 2006 and 2016.

#p´(t)=2tln(t+2)+(t^2+100/x+2)

#number of years from 2000

def p(t):

return 2.0\*t\*log(t+2.0)+((t\*\*2+100)/t+2)

print p(6)

print p(16)

Answer p(6)= 48.9532985002

P(16)= 116.491896253

**Question 7.**

G(x)=

G’(x)= 12000()=

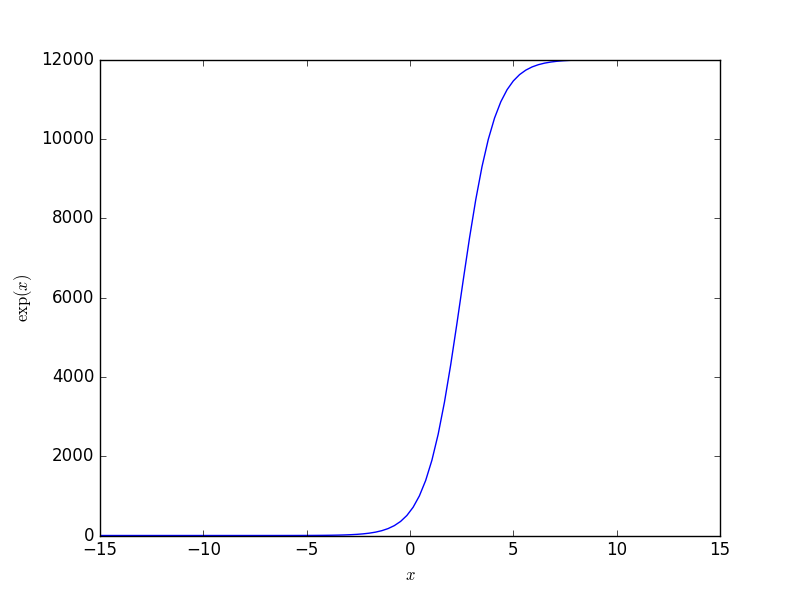
=12000((

= 12000(

=

=1200(-)(-22.8=

=



# -\*- coding: utf-8 -\*-

import numpy as np

import matplotlib.pyplot as plt

from math import \*

x = np.linspace(-15, 15, 100)

y= 12000.0/(1.0+19.0\*np.exp(-1.2\*x))

plt.figure()

plt.plot(x, y)

plt.xlabel('$x$')

plt.ylabel('$\exp(x)$')

plt.show()

G’(t) will never be zero. Not sure I understand the question. The growth rate will never decline but at x=5 it will flatten out and become constant.

**Questions 8**

= (2/)=

=

=())=

=(

==

==

The mean life of this species of bird is .

**Question9**

f(x)=

f(0)=0.0015

f(6)=0.5520

Step one, f(x)>=0 is true.

===1-0=1

Second condition is true.

Answer: Function is probability density function on the specified interval.

**Question10**

f(x)=-5x-(15/x)

f’(x)=-5+

Domain-The function is undefined when x=0 so 0 is not in domain of the function. It fails to exist when x=0..

f’(x)=0 when x=-1.7321 or x=1.7321.

The critical numbers of the function are -1.7321 and 1.7321. We can define following intervals:

(

f’(-5)=-4.4

f’(-1.5)=1.67

f’(1.5)=1.67

f’(-5)=-4.4

The function in interval ( is decreasing.

The function in interval and is increasing

f’’(x)= -

The intervals of concavity are ( because for x=0 f’’(x) is undefined. This is the functions inflection point since f’’(x) does not exist for x=0.

f’’(-2)=3.75

f’’(2)=-3.75

The function is concave upward in ( and concave downward in .

