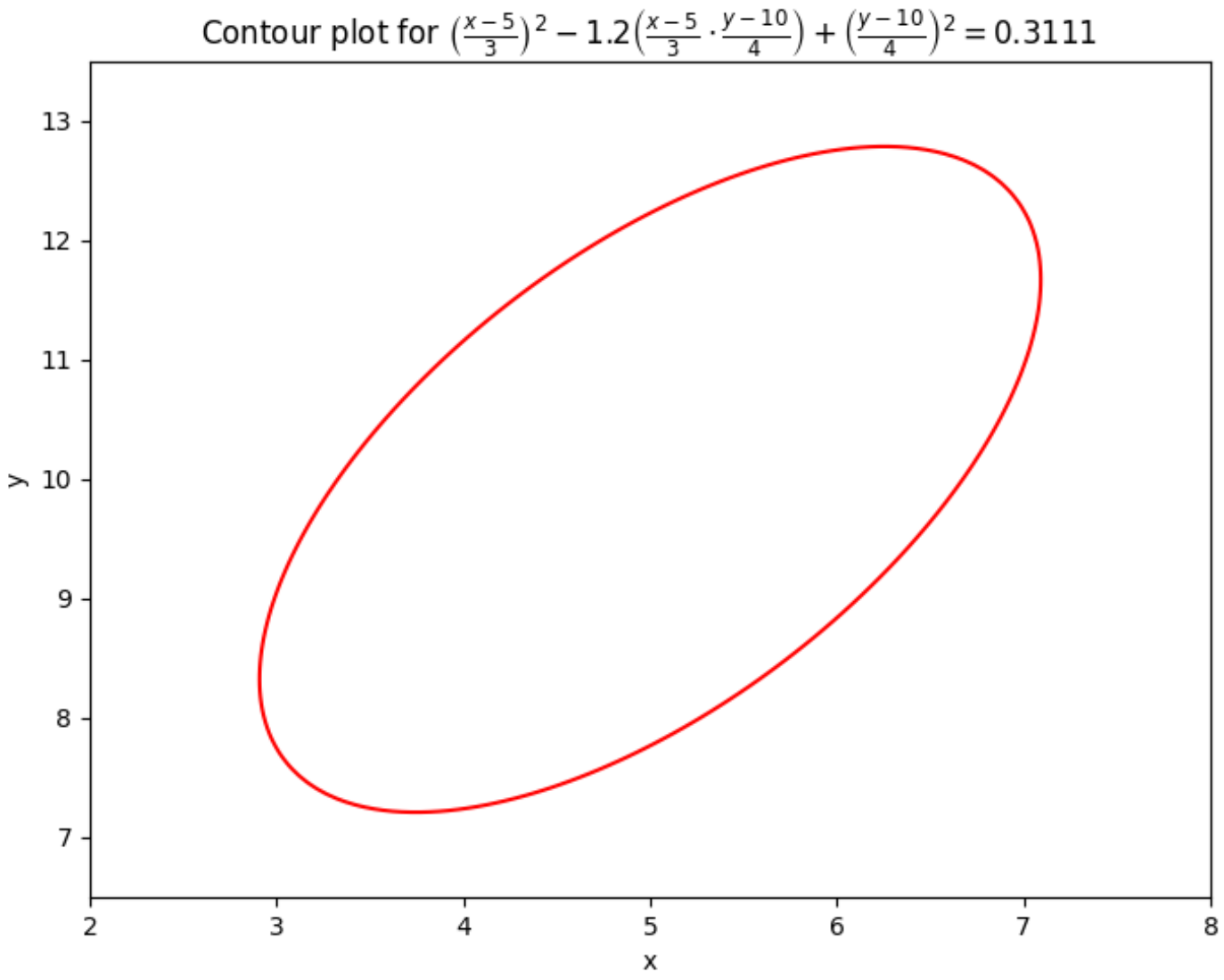
Άσκηση 1.2, Ερώτημα Δ

Σχεδιασμός της ισοσταθμικής καμπύλης:



Ο κώδικας που χρησιμοποιήθηκε είναι ο ακόλουθος:

```
import numpy as np
import matplotlib.pyplot as plt
# Define the function based on the given equation
def contour_function(x, y):
    term1 = ((x - 5) / 3) ** 2
    term2 = -1.2 * ((x - 5) / 3) * ((y - 10) / 5)
    term3 = ((y - 10) / 5) ** 2
    return term1 + term2 + term3

# Set up the grid of x and y values
x = np.linspace(-5, 15, 400)
y = np.linspace(0, 20, 400)
X, Y = np.meshgrid(x, y)

# Calculate Z values on the grid
Z = contour_function(X, Y)
# Define the contour level based on the given constant
contour_level = 0.111111111113
# Plotting
plt.figure(figsize=(8, 6))
contour = plt.contour(X, Y, Z, levels=[contour_level], colors='red')
plt.xlabel('x')
plt.ylabel('y')
plt.title(r'Contour Plot')
plt.xlim([2.5, 7.5])
plt.ylim([7.5,12.5])
plt.show()
```

Για τα προηγούμενα ερωτήματα οι υπολογισμοί έγιναν με τον ακόλουθο κώδικα

```
from scipy.stats import norm
from math import sqrt
# (b)
y = 10 # y > 10
mean_y_given_x = 10.8
std_y_given_x = sqrt(10.24)
prob = norm.sf(y, loc=mean_y_given_x, scale=std_y_given_x)
print(f"Probability is : {prob:.4f}")
# (c)
x = 5 # x > 5
mean_y_given_x = 4.55
std_y_given_x = sqrt(5.76)
prob = norm.sf(x, loc=mean_y_given_x, scale=std_y_given_x)
print(f"Probability is : {prob:.4f}")
```