Bài 1.

$$x^2 + y^2 + z^2 = 0 \tag{I}$$

Bài 2.

$$\begin{multline}F = \{F_x \in F_c : (|S| > |C|)\cap \\ (M_{inPixels} < |S| < max_{inPixels})\cap \\ (|S_{connected}| > |S| - \epsilon)\}\end{multline} \tag{1}$$

Bài 3.

$$\begin{aligned} x &= 1 & xy &= 2 & xyz &= 3 \\ xy &= 23 & xyz &= 3 & x &= 11 \\ xyz &= 345 & x &= 1 & xyz &= 22 \end{aligned}$$

Bài 4.

$$\boxed{x_1x_2x_3 = \frac{-d}{a}} \tag{[2]}$$

$$x_1x_2 + x_2x_3 + x_3x_1 = \frac{c}{a} \tag{[3]}$$

Đồng thời:

$$x_1 + x_2 + x_3 = \frac{-b}{a} \tag{[4]}$$

Bài 5.

$$\overbrace{\overset{+}{A} + \underset{-}{B} + A^{B^{C^2}} + \frac{\omega}{\Phi}}^{\text{Vế trái}} = \underbrace{\underset{+}{A} + \underset{*}{B} + 12\frac{A^B}{C} + \frac{\Omega}{\varphi}}_{\text{Vế phải}} \tag{Pt.5}$$

Bài 6.

$$\frac{(\sqrt{3}+\sqrt{2})}{\sqrt{5}-\sqrt{7}} = \frac{\dfrac{(\sqrt{3}+\sqrt{2})(\sqrt{5}+\sqrt{7})}{(\sqrt{5}+\sqrt{7})}}{\dfrac{(\sqrt{5}-\sqrt{7})(\sqrt{5}+\sqrt{7})}{(\sqrt{5}+\sqrt{7})}} \tag{2}$$

Bài 7.

Listing 1: Mã nguồn Python

```python
def factorial(n):
    if n == 0 or n == 1:
        return 1
    else:
        return n * factorial(n - 1)

num = 5
result = factorial(num)
print(f"The factorial of {num} is {result}.")
```

Bài 7.

Algorithm 1 QuickSort

```
procedure QuickSort(arr, low, high)
    if low < high then
        pivot ← Partition(arr, low, high)
        QuickSort(arr, low, pivot − 1)
        QuickSort(arr, pivot + 1, high)

procedure Partition(arr, low, high)
    pivot ← arr[high]
    i ← low − 1
    for j ← low to high − 1 do
        if arr[j] ≤ pivot then
            i ← i + 1
            swap arr[i] and arr[j]
    swap arr[i + 1] and arr[high]
    return i + 1
```

Now the exponent in the joint density in (4-11) can be simplified. By Result 4.9(a),

$$\begin{aligned}(\mathbf{x}_j - \boldsymbol{\mu})'\boldsymbol{\Sigma}^{-1}(\mathbf{x}_j - \boldsymbol{\mu}) &= tr[(\mathbf{x}_j - \boldsymbol{\mu})'\boldsymbol{\Sigma}^{-1}(\mathbf{x}_j - \boldsymbol{\mu})] \\ &= tr[\boldsymbol{\Sigma}^{-1}(\mathbf{x}_j - \boldsymbol{\mu})(\mathbf{x}_j - \boldsymbol{\mu})'] \end{aligned} \tag{4-12}$$

Next,

$$\begin{aligned}\sum_{j=1}^{n}(\mathbf{x}_j - \boldsymbol{\mu})'\boldsymbol{\Sigma}^{-1}(\mathbf{x}_j - \boldsymbol{\mu}) &= \sum_{j=1}^{n} tr[(\mathbf{x}_j - \boldsymbol{\mu})'\boldsymbol{\Sigma}^{-1}(\mathbf{x}_j - \boldsymbol{\mu})] \\ &= \sum_{j=1}^{n} tr[\boldsymbol{\Sigma}^{-1}(\mathbf{x}_j - \boldsymbol{\mu})(\mathbf{x}_j - \boldsymbol{\mu})'] \\ &= tr\left[\boldsymbol{\Sigma}^{-1}\left(\sum_{j=1}^{n}(\mathbf{x}_j - \boldsymbol{\mu})(\mathbf{x}_j - \boldsymbol{\mu})'\right)\right] \end{aligned} \tag{4-13}$$