Math for 3D/Games Programmers

Intro

https://wojtsterna.com/math-for-3d-programmers

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Who Am I, Anyway?

- Wojtek Sterna
- I am a software engineer who's worked in video games professionally for well over 10 years now. Mostly as an engine/graphics programmer
- I've worked at companies like NVIDIA, id Software, CD PROJEKT RED and Flying Wild Hog
- https://wojtsterna.com


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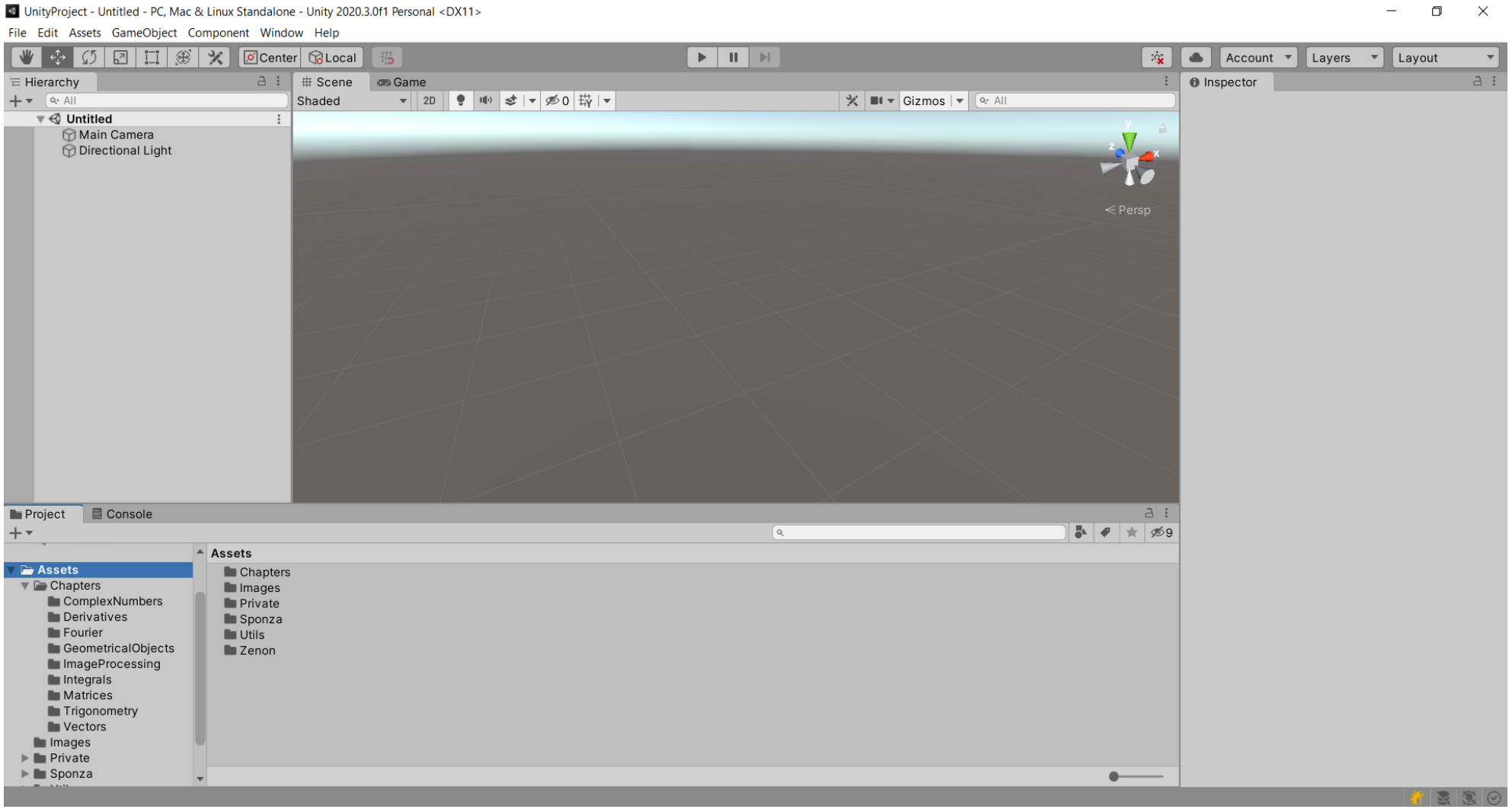
Unity



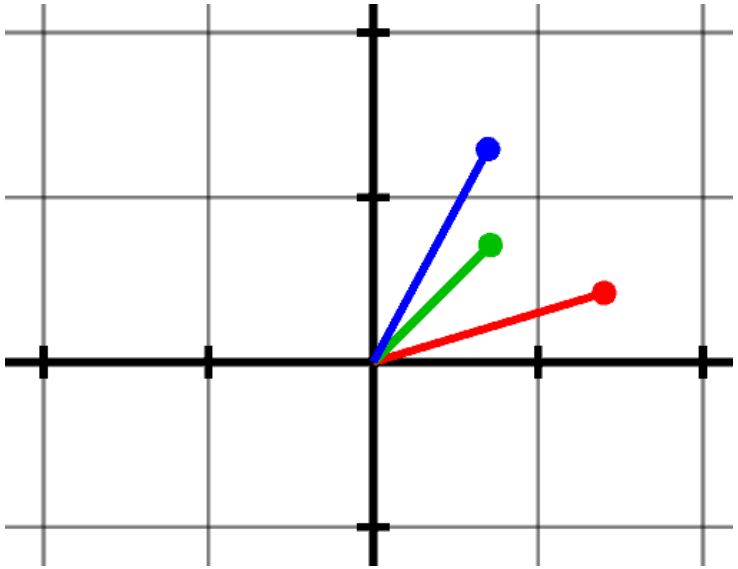
Unity

- Zenon – a helper library for 2D/3D drawing

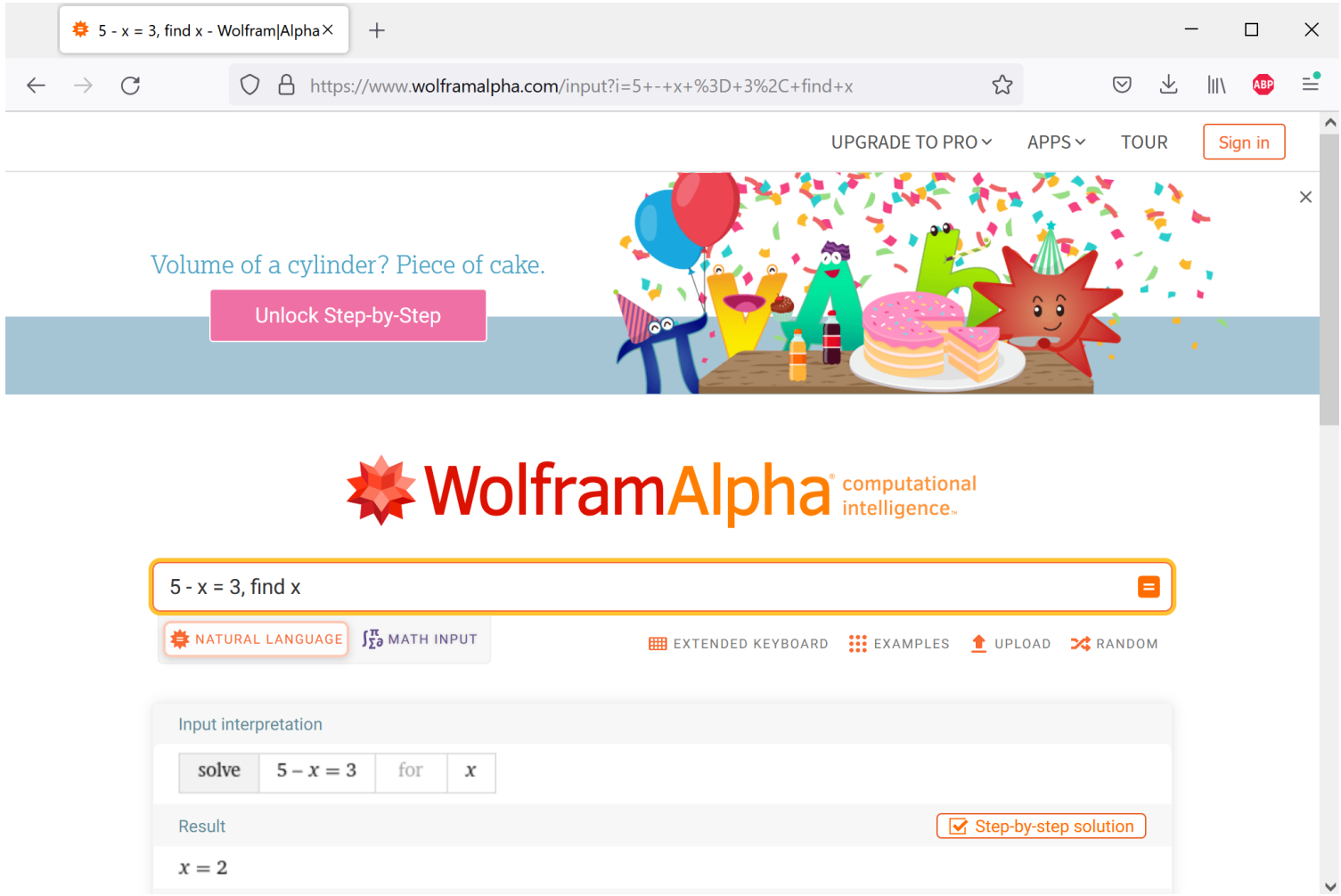
ComplexNumbers.cs

Assembly-CSharp | ComplexNumbers.Complex

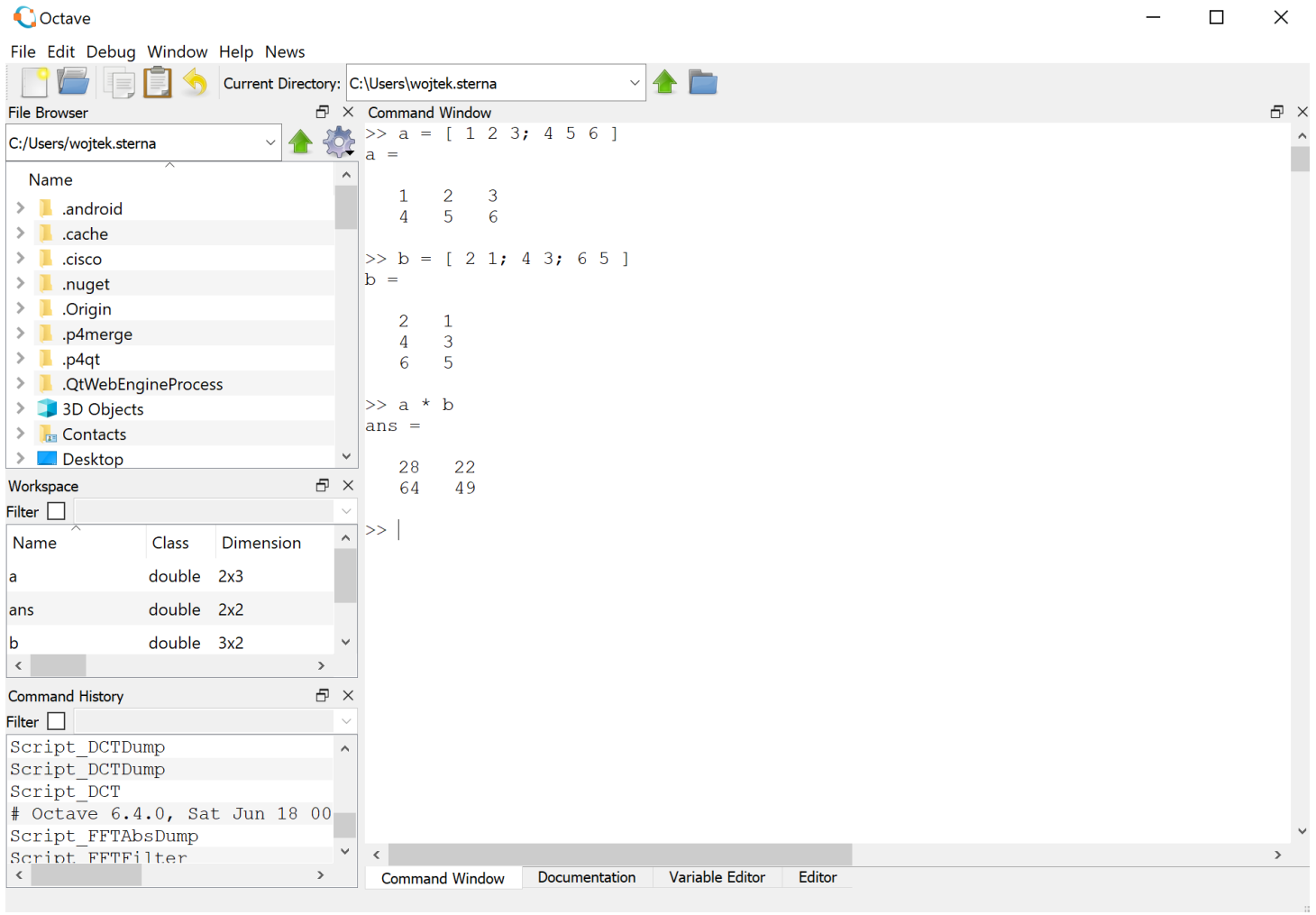
```
Unity Message | 0 references
31      void Update()
32      {
33          Zenon.CanvasWidth = 10.0f;
34          Zenon.DrawRect(Zenon.GetCanvasWidth(), Zenon.GetCanvasHeight(), 10000, Color.white);
35          Zenon.DrawCoordSystem(true, 15.0f, 10.0f, 1.0f, 0.05f, 10001);
36
37          c3 = Complex.Mul(c1, c2);
38
39          Zenon.DrawCircle(c1.a, c1.b, 0.075f, 10002, Color.red);
40          Zenon.DrawCircle(c2.a, c2.b, 0.075f, 10003, Zenon.ColorGreen075);
41          Zenon.DrawCircle(c3.a, c3.b, 0.075f, 10004, Color.blue);
42          Zenon.DrawSegment(0.0f, 0.0f, c1.a, c1.b, 0.05f, 10002, Color.red);
43          Zenon.DrawSegment(0.0f, 0.0f, c2.a, c2.b, 0.05f, 10003, Zenon.ColorGreen075);
44          Zenon.DrawSegment(0.0f, 0.0f, c3.a, c3.b, 0.05f, 10004, Color.blue);
45      }
46  }
```



Wolfram



Octave



$\sum$ Notation

- We use this notation to more compactly describe a sum of elements
- Instead of writing a series like this:

$$S(n) = 1 + 3 + 5 + \cdots + (2n - 1)$$

we can write it down more concisely like so:

$$S(n) = \sum_{i=1}^{n} (2i - 1)$$

Bibliography

- 3D Math Primer for Graphics and Game Development
- Mathematics for 3D Game Programming and Computer Graphics
- Engineering Mathematics, K. A. Stroud
- Many other sources to which references will be given as we go along