

# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Learning Guide . . . . .	1
1.2	Conventions . . . . .	2
<b>2</b>	<b>Right Triangle</b>	<b>3</b>
2.1	Pythagorean Theorem . . . . .	3
2.2	Pythagorean Triplet . . . . .	5
2.3	Useful Conclusions . . . . .	7
2.4	Practice . . . . .	9
<b>3</b>	<b>Arbitrary Triangle</b>	<b>13</b>
3.1	Angle Bisector Theorem . . . . .	13
3.2	Law of Sines and Law of Cosines . . . . .	15
3.3	Stewart Theorem . . . . .	18
3.4	Practice . . . . .	20
<b>4</b>	<b>Circle</b>	<b>23</b>
4.1	Central Angle and Inscribed Angle . . . . .	23
4.2	Concyclic Quadrilateral . . . . .	25
4.3	Ptolemy's Theorem . . . . .	29
4.4	Power of a Point . . . . .	30
4.5	Circumscribed Quadrilateral . . . . .	32
4.6	Practice . . . . .	34
<b>5</b>	<b>Cevian and Transversal</b>	<b>41</b>
5.1	Cevian and Transversal Defined . . . . .	41
5.2	Ceva's Theorem . . . . .	42
5.3	Menelaus' Theorem . . . . .	43
5.4	Trigonometric Ceva's Theorem . . . . .	44
5.5	Concurrent Lines . . . . .	45
5.6	Practice . . . . .	46
<b>6</b>	<b>Additional Topics</b>	<b>51</b>
6.1	Area Computation . . . . .	51

# CONTENTS

---

6.1.1	Triangle . . . . .	51
6.1.2	Ratio of Triangles Areas . . . . .	53
6.1.3	Quadrilateral . . . . .	57
6.1.4	Pick's Theorem . . . . .	58
6.2	Triangle Centers . . . . .	59
6.2.1	Centroid (Center of Mass) . . . . .	59
6.2.2	Orthocenter . . . . .	60
6.2.3	Circumcenter . . . . .	63
6.2.4	Incenter . . . . .	65
6.3	Special Points, Lines and Others . . . . .	66
6.4	Practice . . . . .	67
<b>7</b>	<b>Solutions</b>	<b>73</b>
7.1	<i>Chapter 1</i> . . . . .	74
7.2	<i>Chapter 2</i> . . . . .	75
7.3	<i>Chapter 3</i> . . . . .	85
7.4	<i>Chapter 4</i> . . . . .	94
7.5	<i>Chapter 5</i> . . . . .	110
7.6	<i>Chapter 6</i> . . . . .	123