

8, 8/1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 16, 18, 19, 22, 24, 25

### Euclid

1. 1 parallel line
2.  $\text{sum} = 180^\circ$  of  $\triangle$ 's
4. ~~other~~ right  $\angle$ 's, parallel
5. intersect 1 pt.
6. infinite length

### Riemann

7. no parallel to given line
8.  $\text{Sum of angles} > 180^\circ$
10. finite length
11. intersect twice (gt. arcs)
12. 2 sides to make a polygon

### Lobachevsky

13. more than one parallel - inf. many
14.  $\text{sum of angles} < 180^\circ$
16. not nec. parallel to each other
18. finite length
19. Parallel Postulate: given line  $\ell$  & pt. not on line, one parallel line can be drawn
22. Carl Gauss - first non-Euclidean
24. Copernicus of geometry is Lobachevsky - challenged establishment
25. Riemann invented geometry where parallel lines don't exist