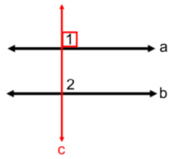
Geometry - Proof Review

January 12, 2018

Theorem: In a plane, a line perpendicular to one of two parallel lines is also perpendicular to the other.

Given: c⊥a and a||b

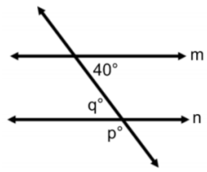
Prove: c⊥b



Statements	**Reasons**
c⊥a	Given
31. ∠1 is a right angle	perpendicular lines form right angles
32. ∠1 = 90°	Right angles measure 90°
a||b	Given
33. ∠1 = ∠2	Parallel lines form equal corresponding angles
34. ∠2=90°	Substitution (#32 into #33)
35. ∠2 is a right angle	90° ∠'s are right ∠'s
36. c⊥b	lines meeting at right angles are perpendicular

***Given*: m||n**

***Prove*: p°-q°=100°**

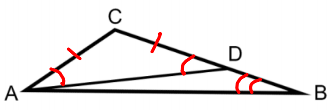


Statements	**Reasons**
m||n	Given
37. q°=40°	parallel lines form equal alternate interior ∠'s
38. q° and p° are supplementary	angles in a linear pair are supplementary
39. q° + p° = 180°	Supplementary angles sum to 180°
40°+p°=180°	Substitution
40. p° = 140°	Subtraction and simplification
41. p°-q°=100°	substitution, subtraction & simplification #40 - #37

Theorem: If two sides of a triangle are unequal, the angles opposite them are unequal in the same order.

Given: ΔABC with BC>AC

42. *Prove*: $\angle CAB > \angle B$



Statements	**Reasons**
ΔABC with BC>AC	Given
Choose D on CB so that CD=CA	Ruler Postulate
43. Draw AD	2 points define a line
44. $\angle CDA = \angle CAD$	If two sides of a triangle are equal, the angles opposite them are equal.
45. ∠CAB=∠CAD+∠DAB	Betweenness of Rays Theorem
46. ∠CAB>∠ CAD	Whole greater than part
∠CAB>∠CDA	Substitution
47. ∠CDA>∠B	an exterior angle is larger than either remote interior angle
48. $\angle CAB > \angle B$	Transitive

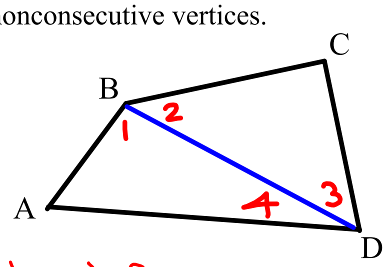
7.1 – Quadrilaterals

Def: A diagonal of a polygon is a line segment that connects any two nonconsecutive vertices.

Theorem 24: The sum of the angles of a quadrilateral is 360°.

Given: Quadrilateral ABCD

Prove: $\angle A + \angle B + \angle C + \angle D = 360°$



Proof:

1. Draw diagonal BD.	2 points define a line
2. $\angle A + \angle 1 + \angle 4 = 180°$ $\angle C + \angle 2 + \angle 3 = 180°$	The angles in a triangle sum to 180°
3. $\angle A + \angle C + \angle 1 + \angle 2 + \angle 3 + \angle 4 = 360°$	Addition
4. $\angle B = \angle 1 + \angle 2$ $\angle D = \angle 3 + \angle 4$	Betweenness of Rays Theorem
5. $\angle A + \angle B + \angle C + \angle D = 360°$	Substitution