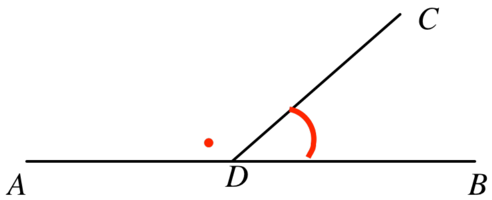
Deductive geometry toolkit: Solutions

http://topdrawer.aamt.edu.au/Geometric-reasoning/Good-teaching/Writing-a-proof/Proving-Pythagoras-theorem/Geometry-toolkit

Keep this sheet as a summary of geometry reasons.
Complete the following by giving the reasons for each statement.
In each example, mark the angles mentioned in the diagram. Use the same mark if the angles are equal and a different mark if they are not equal.

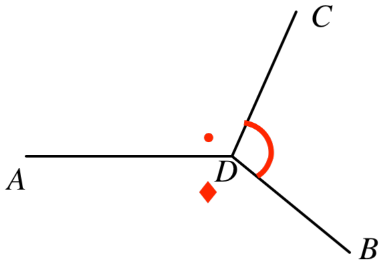
1.



$\angle ADC + \angle BDC = 180°$

(straight angle or straight line)

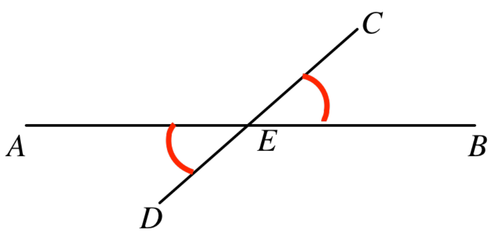
2.



$\angle ADC + \angle CDB + \angle BDA = 360°$

(revolution or angles at a point)

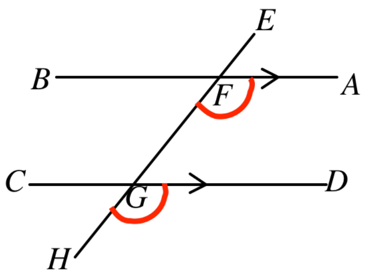
3.



$\angle AED = \angle CEB$

(vertically opposite)

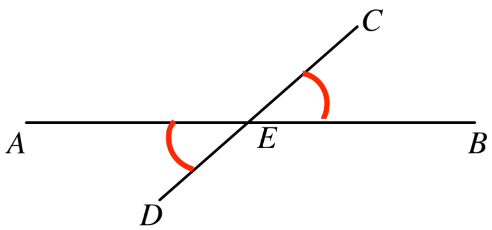
4.



$\angle AFG = \angle DGH$

(corresponding angles, $AB \parallel DC$)

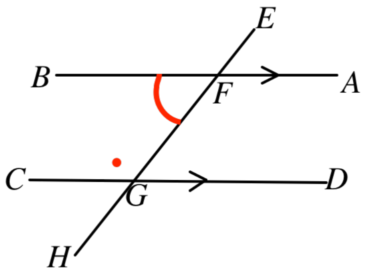
5.



$\angle BFG = \angle FGD$

(alternate angles, *BA* || *CD*)

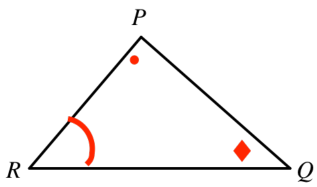
6.



$\angle BFG + \angle FGC = 180°$

(cointerior angles, *BA* || *CD*)

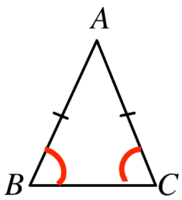
7.



$\angle P + \angle Q + \angle R = 180°$

(angle sum of ΔPQR)

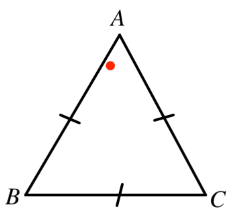
8.



$\angle B = \angle C$

(opposite equal sides in ΔABC or base angles of isosceles ΔABC)

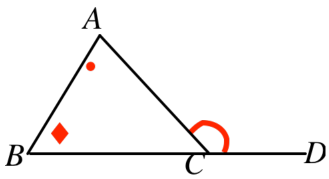
9.



$\angle A = \angle B = \angle C = 60°$

(equilateral triangle ΔABC)

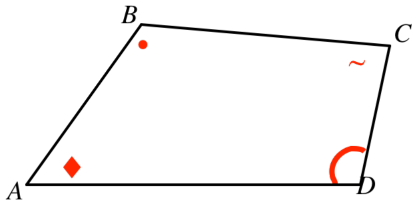
10.



$\angle ACD = \angle A + \angle B$

(exterior angle of ΔABC)

11.



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

(angle sum of quadrilateral *ABCD*)

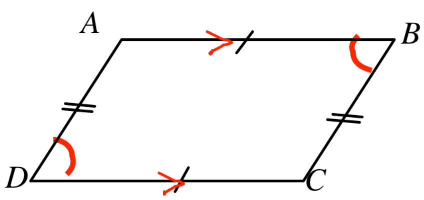
12. **Special quadrilaterals**

In addition to the reasons given so far you can use the properties of quardilaterals to give reasons for

- intervals being the same length
- lines being parallel
- angles being equal
- angles being 90°.

Below are just two examples but there are many more reasons associated with special quadrilaterals

(a)



ABCD is a parallelogram

(two pairs of opposite sides equal)

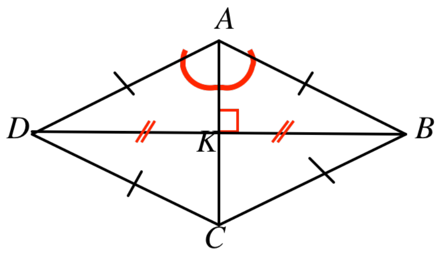
i) $AB \parallel DC$

(opposite sides of parallelogram *ABCD*)

ii) $\angle B = \angle D$

(opposite angles of parallelogram *ABCD*)

(b)



ABCD is a rhombus

i) $\angle BAK = \angle KAD$

(diagonals bisect angles of rhombus)

ii) $\angle BKA = 90°$

(diagonals of rhombus are perpendicular)

iii) $BK = KD$

(diagonals of a rhombus bisect each other)