

Chapter 2- Lesson 1

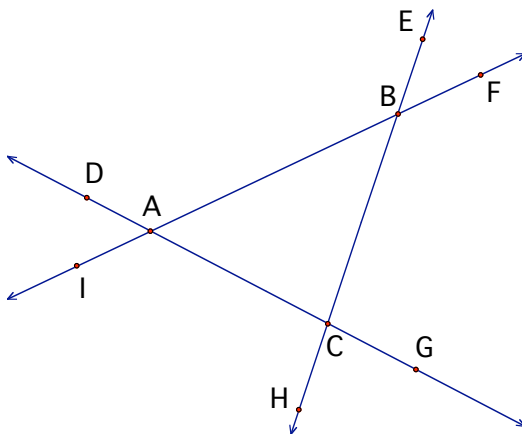
Missing Angle Puzzles¹

Without measuring, deduce the measures of the angles in the diagrams below using the information given. Then write steps which show how you figured out the specified angle.

Puzzle 1

Given: $m\angle DAI = 40^\circ$, $m\angle FBC = 120^\circ$

Find: The measure of as many angles as you can. Label the angles with their measures.



Write steps which show how you figured out $m\angle HCG$.

Assumptions from Drawings

You **may** assume only the following from a drawing or diagram:

- If it looks straight, it is straight
- If points look like they are collinear, they are collinear
- If a point looks like it is between other points, it is.
- The position of the points in relation to each other are accurate

You **may not** assume:

- Angle measures, including right angles
- Lengths of segments or that segments are congruent
- Relative sizes of segments and angles

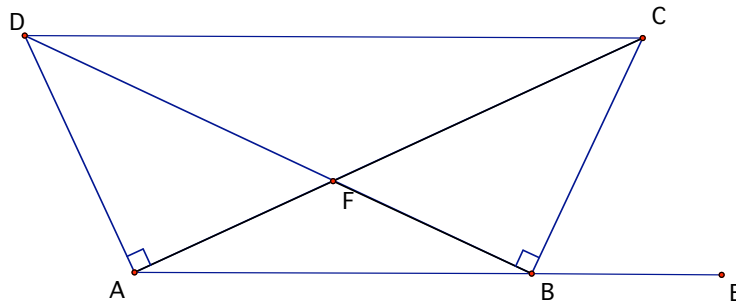
What ideas were really important for solving the above puzzle?

¹ These puzzles are based on Groundworks- Algebraic Puzzles and Problems, Greenes/Findell

Puzzle 2

Given: Quadrilateral ABCD is a trapezoid with $\overline{AB} \parallel \overline{DC}$, $m\angle FAB = 25^\circ$, $m\angle CFB = 50^\circ$.

Find: The measure of as many angles as you can. Label the angles with their measures.



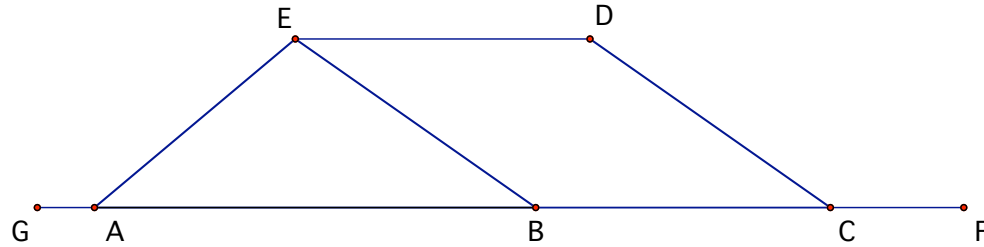
Write steps which show how you figured out $m\angle FDC$.

What ideas were really important for solving the above puzzle?

Puzzle 3

Given: Quadrilateral BCDE is a parallelogram, $\overline{AE} \cong \overline{EB}$, $m\angle EAB = 40^\circ$.

Find: The measure of as many angles as you can. Label the angles with their measures.



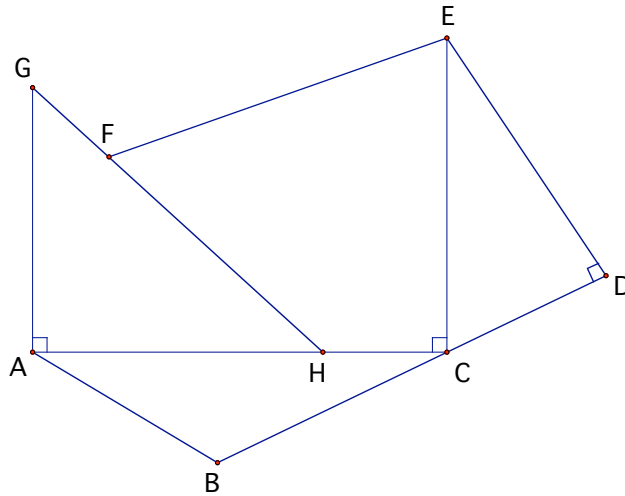
Write steps which show how you figured out $m\angle EDC$.

What ideas were really important for solving the above puzzle?

Puzzle 4

Given: $\overline{FE} \parallel \overline{BD}$, $m\angle B = 128^\circ$, $m\angle FHC = 145^\circ$, $m\angle ECD = 70^\circ$

Find: The measure of as many angles as you can. Label the angles with their measures.



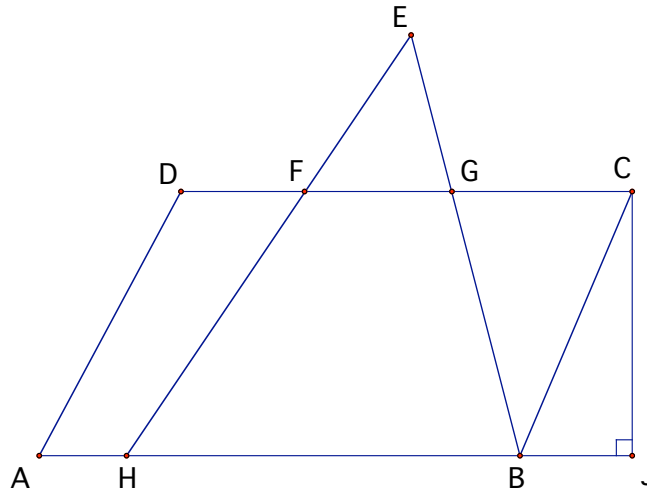
Write steps which show how you figured out $m\angle EFH$.

What ideas were really important for solving the above puzzle?

Puzzle 5

Given: Quadrilateral ABCD is a parallelogram, $m\angle FHB = 48^\circ$, $m\angle HBG = 80^\circ$, and $m\angle GCB = 60^\circ$.

Find: The measure of as many angles as you can. Label the angles with their measures.



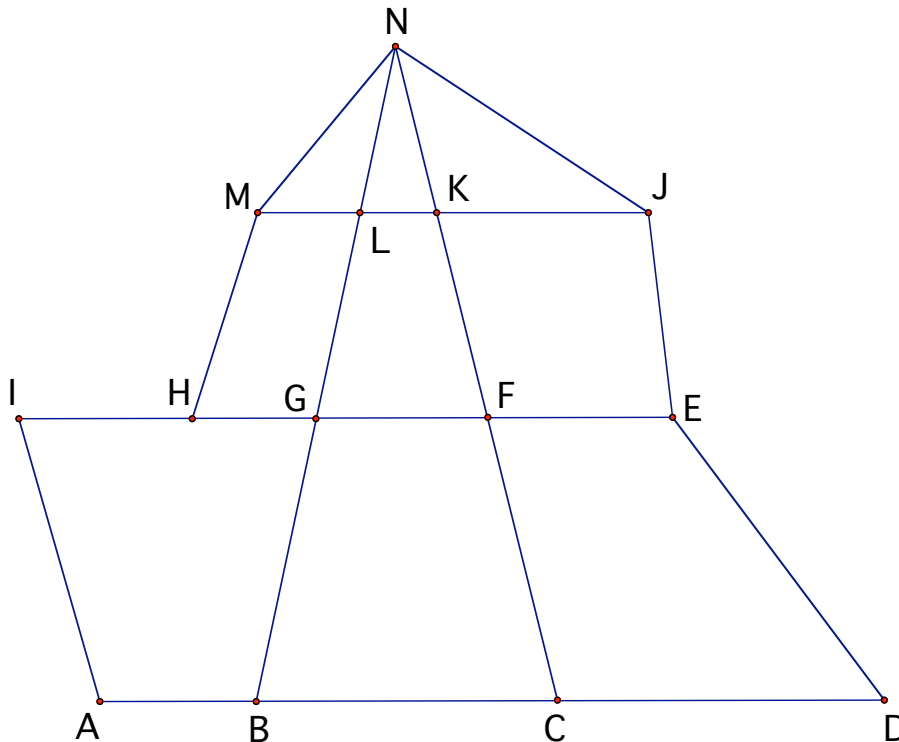
Write steps which show how you figured out $m\angle HFG$.

What ideas were really important for solving the above puzzle?

Puzzle 6

Given: $\overline{AD} \parallel \overline{IE} \parallel \overline{MJ}$, $m\angle HIA = 85^\circ$, $m\angle NML = 40^\circ$, $m\angle MLN = 100^\circ$, $m\angle LNK = 25^\circ$,
 $m\angle NJK = 30^\circ$, $m\angle EDC = 65^\circ$, $m\angle BCF = 75^\circ$.

Find: The measure of as many angles as you can. Label the angles with their measures.



Write steps which show how you figured out $m\angle FED$

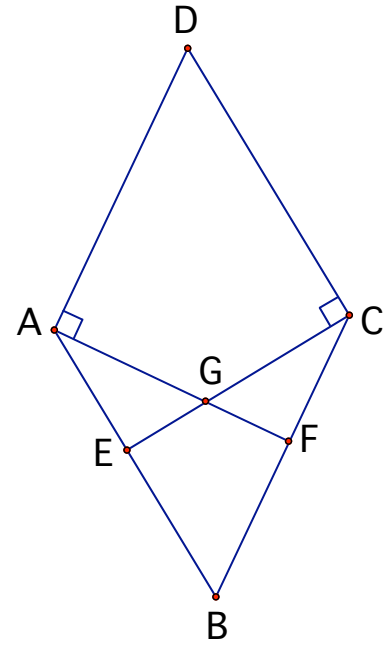
What ideas were really important for solving the above puzzle?

Puzzle 7

Given: Quadrilateral ABCD is a kite, $m\angle D = 65^\circ$, $m\angle B = 50^\circ$,
 $m\angle DAB = m\angle BCD$.

Find: The measure of as many angles as you can. Label the angles with their measures.

Write steps which show how you figured out $m\angle GFC$.

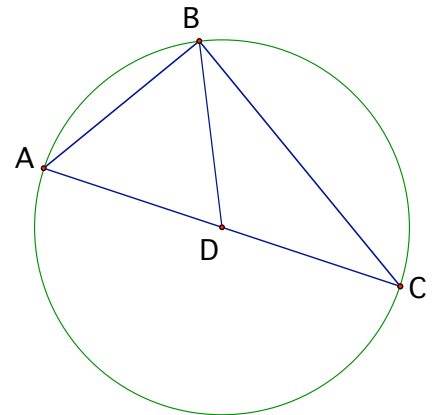


What ideas were really important for solving the above puzzle?

Puzzle 8

Given: $\odot D$, $m\angle BDC = 120^\circ$

Find: The measure of as many angles as you can. Label the angles with their measures.



Write steps which show how you figured out $m\angle DAB$.

What ideas were really important for solving the above puzzle?

What is $m\angle ABC$ in the puzzle? What would be its measure if $m\angle BDC$ had been something other than 120° ? Justify your answer.