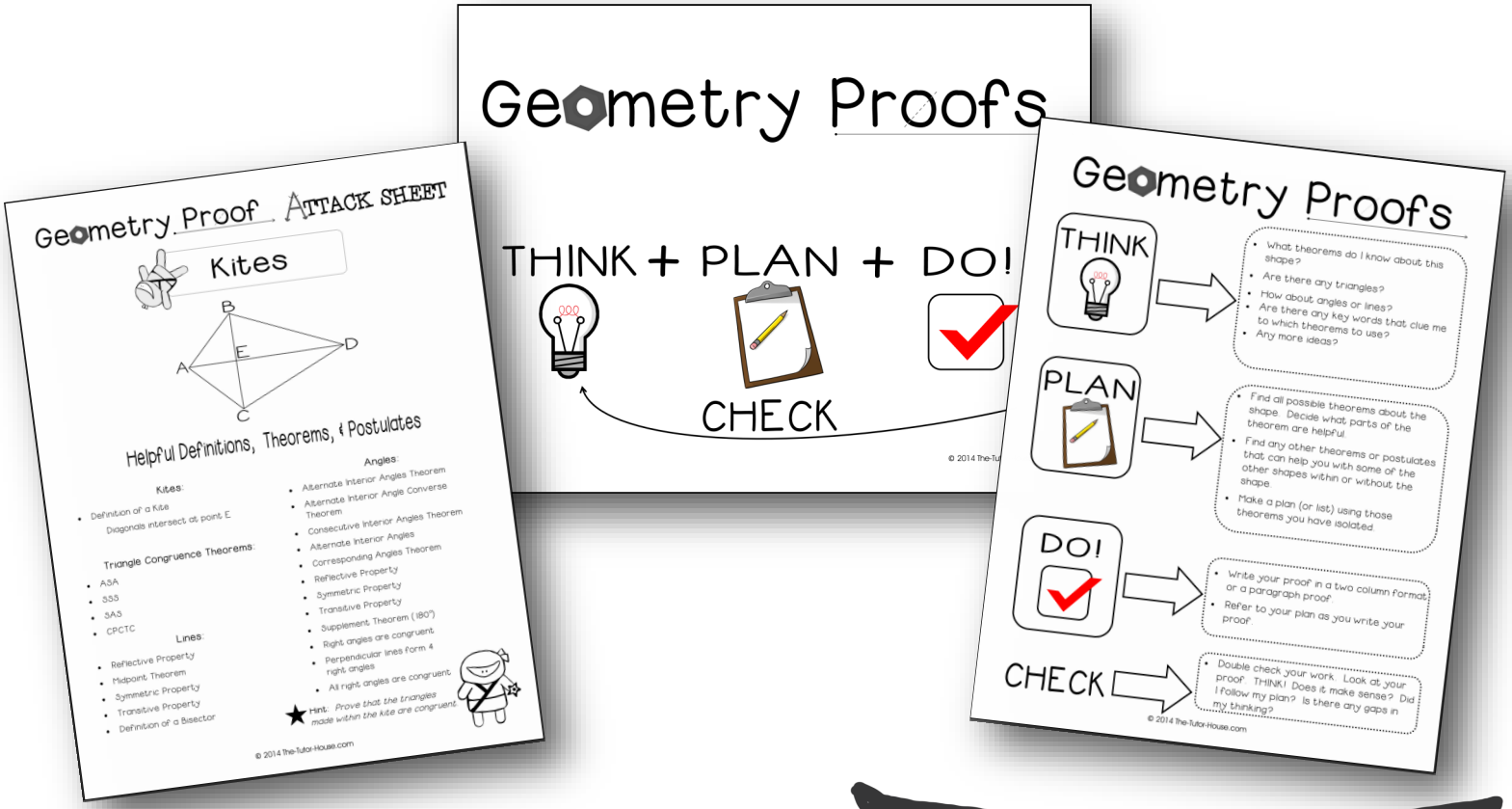
Geometry Proof ATTACK SHEETS



Includes Attack Sheets for:

Lines & Angles, Triangles, Squares & Rhombi, Rectangles, Parallelograms, Kites, Trapezoids, and Circles

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Geometry Proofs

Every time I tutor geometry, I hear these common complaints about proofs:

"When will I ever use this?"

"Why do they have to be so hard?"

Proofs can teach many skills to students beyond learning to endure what feels like torture. Here are some truths about proofs:

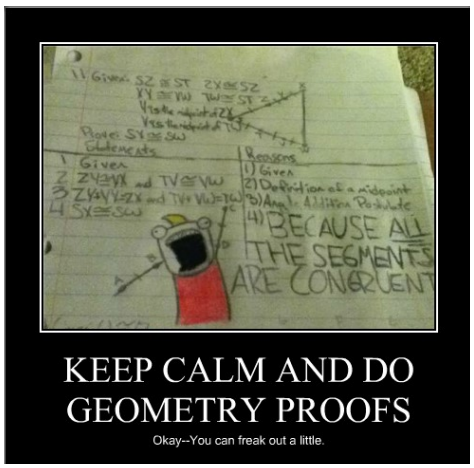
1. They are all around you every day.
2. Practice makes perfect...no scratch that— Practice makes better!
3. Proofs do help you in real life.

With over a hundred different theorems, postulates, and definitions in geometry; it can be overwhelming to know where to start. I decided to create Geometry Proof Attack Sheets that can help a student hone in on which of all those theorems, postulates, and definitions are needed to complete a proof. Students will need to do four basic things to attack proofs:

1. Think 2. Plan 3. Do! 4. Check

This catchy phrase came from an executive function article I read recently. I realized that this pattern holds true for proofs as well. Using these steps, I outlined some questions that students can ponder on as they attack a proof. Refer to the Think, Plan, Do, Check sheets to see the leading questions. I also included a poster to display to remind your students of the above steps.

Each page has a shape or figure that is typically seen in geometry proofs. The pages do not include a specific proof; but general theorems, postulates, and definitions that are helpful when solving a proof for that particular shape. Provide students with the geometry proof attack sheet and either a glossary of geometry terms for their reference as they decide which theorems and such to use. Students can also glue these into their math notebooks right along side their notes and diagrams.



Please note. I am going to repeat myself-- Each geometry attack sheet *does not* include every definition, theorem, or postulate that can apply to a shape or figure. I tried to use the most commonly used definitions, theorems, and postulates that I've come across when doing proofs with students. It is a guide, not an exact "how-to" solve proofs.

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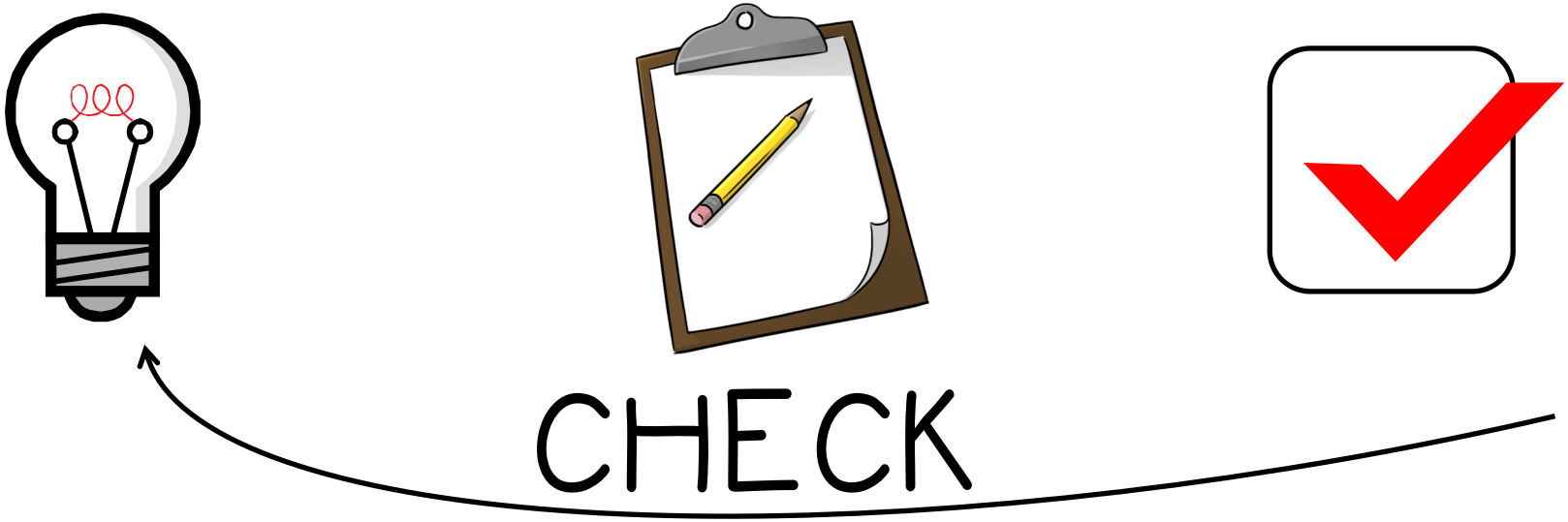
Geometry Proofs

THINK + PLAN + DO!



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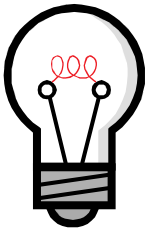
Geometry Proofs

THINK



- What theorems do I know about this shape?
- Are there any triangles?
- How about angles or lines?
- Are there any key words that clue me to which theorems to use?
- Any more ideas?

PLAN

- Find all possible theorems about the shape. Decide what parts of the theorem are helpful.
- Find any other theorems or postulates that can help you with some of the other shapes within or without the shape.
- Make a plan (or list) using those theorems you have isolated.

DO!

- Write your proof in a two column format or a paragraph proof.
- Refer to your plan as you write your proof.

CHECK

- Double check your work. Look at your proof. THINK! Does it make sense? Did I follow my plan? Are there any gaps in my thinking?

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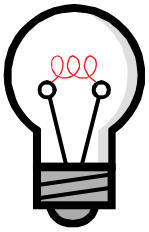
Geometry Proofs

THINK



PLAN

DO!

CHECK

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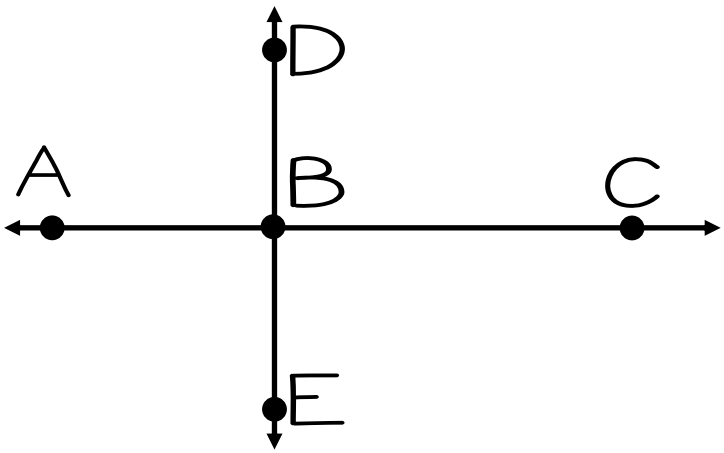
Geometry Proof ATTACK SHEET

Lines & Angles



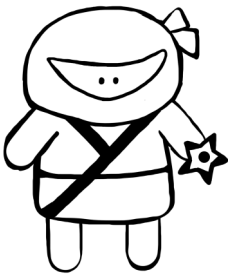
Helpful Definitions, Theorems, & Postulates

Lines:

- Reflective Property
- Midpoint Theorem
- Symmetric Property
- Transitive Property
- Definition of a Bisector
- Addition or Subtraction Property of Equality
- Substitution Property
- Segment Addition Property
- Segment Addition Postulate
- Definition of a Transversal
- Definition of a Skew line
- Definition of Parallel lines

Angles:

- Alternate Interior Angles Theorem
- Alternate Interior Angle Converse Theorem
- Consecutive Interior Angles Theorem
- Alternate Interior Angles
- Corresponding Angles Theorem
- Reflective Property
- Symmetric Property
- Transitive Property
- Supplement Theorem (180°)
- Right angles are congruent
- Perpendicular lines form 4 right angles
- All right angles are congruent
- Definition of Congruent Triangles
- Definition of angles formed by perpendicular lines
- Angle Addition Postulate
- Same-side Exterior Angles Theorem
- Same-side Interior Angles Theorem
- Definition of a Linear Pair
- Vertical Angles Congruence Theorem



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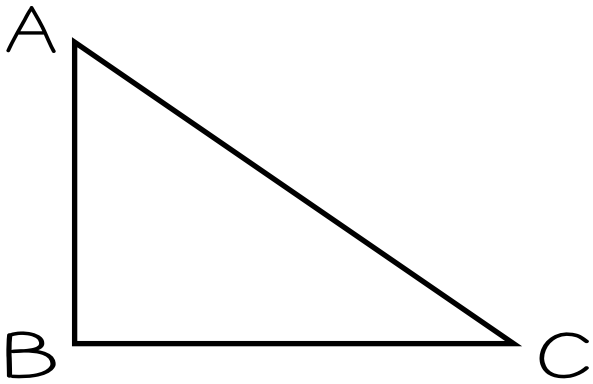
Geometry Proof ATTACK SHEET

Triangles



Helpful Definitions, Theorems, & Postulates

Triangle:

- Definition of a right triangle
- Definition of an isosceles triangle
- Definition of a scalene triangle
- Definition of an equilateral triangle

Triangle Congruence Theorems:

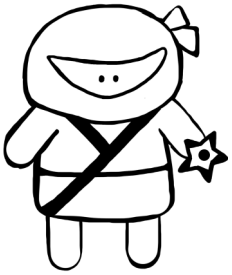
- ASA
- SSS
- SAS
- CPCTC

Lines:

- Reflective Property
- Midpoint Theorem
- Symmetric Property
- Transitive Property
- Perpendicular Bisector Theorem
- Altitude of a triangle

Angles:

- Alternate Interior Angles Theorem
- Alternate Interior Angle Converse Theorem
- Consecutive Interior Angles Theorem
- Alternate Interior Angles
- Corresponding Angles Theorem
- Reflective Property
- Symmetric Property
- Transitive Property
- Triangle Sum Theorem (180°)
- Right angles are congruent
- Perpendicular lines form 4 right angles
- All right angles are congruent
- Exterior Angle Theorem
- Base Angles Theorem
- Hypotenuse-Leg; Leg-Leg; Leg Angle theorem
- Angle Bisector Theorem
- Third Angle Theorem
- Vertical Angles Theorem



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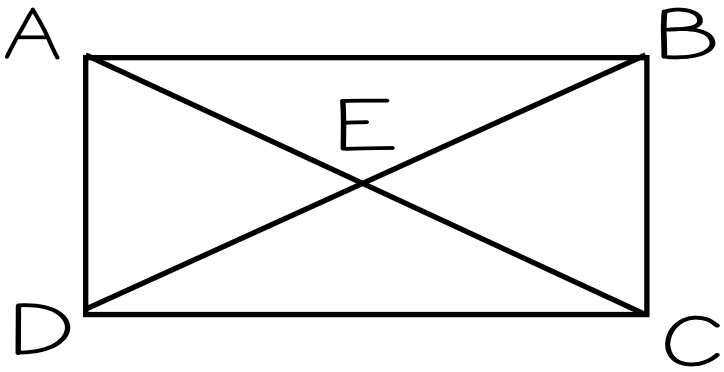
Geometry Proof ATTACK SHEET

Rectangles



Helpful Definitions, Theorems, & Postulates

Rectangles

- Definition of a rectangle
- Perpendicular/parallel line theorem

Triangle Congruence Theorems:

- ASA
- SSS
- SAS
- CPCTC

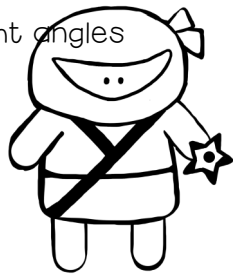
Lines:

- Reflective Property
- Midpoint Theorem
- Symmetric Property
- Transitive Property
- Definition of a Bisector

Angles:

- Alternate Interior Angles Theorem
- Alternate Interior Angle Converse Theorem
- Consecutive Interior Angles Theorem
- Alternate Interior Angles
- Corresponding Angles Theorem
- Reflective Property
- Symmetric Property
- Transitive Property
- Supplement Theorem (180°)
- Right angles are congruent
- Perpendicular lines form 4 right angles
- All right angles are congruent

★ **Hint:** *Prove that the triangles made within the rectangle or are congruent.*



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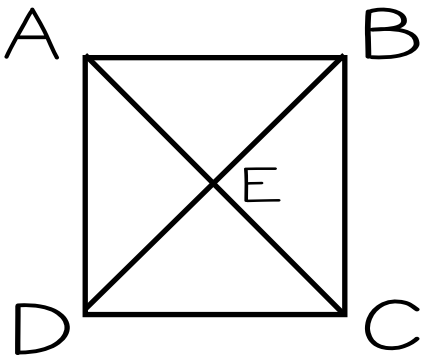
Geometry Proof ATTACK SHEET

Squares & Rhombi



Helpful Definitions, Theorems, & Postulates

Squares and Rhombi

- Definition of a square
- Definition of a rhombus
- Perpendicular/parallel line theorem

Triangle Congruence Theorems:

- ASA
- SSS
- SAS
- CPCTC

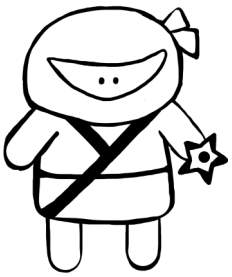
Lines:

- Reflective Property
- Midpoint Theorem
- Symmetric Property
- Transitive Property
- Definition of a Bisector
- Diagonals of a rhombus are congruent

Angles:

- Alternate Interior Angles Theorem
- Alternate Interior Angle Converse Theorem
- Consecutive Interior Angles Theorem
- Alternate Interior Angles
- Corresponding Angles Theorem
- Reflective Property
- Symmetric Property
- Transitive Property
- Supplement Theorem (180°)
- Right angles are congruent
- Perpendicular lines form 4 right angles
- All right angles are congruent

★ **Hint**: *Prove that the triangles made within the square or rhombus or are congruent.*



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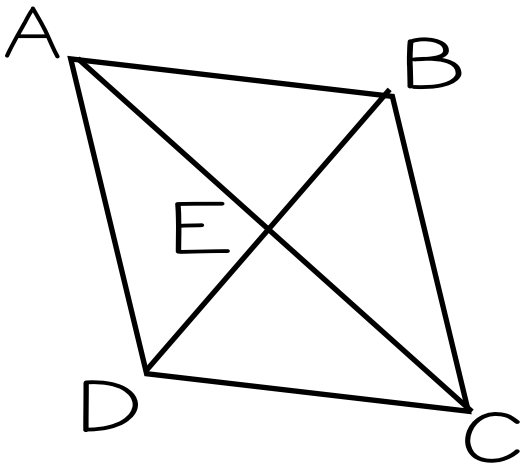
Geometry Proof ATTACK SHEET

Parallelograms



Helpful Definitions, Theorems, & Postulates

Parallelograms:

- Definition of a Parallelogram

  Opposite sides are congruent.
- Parallelogram/Congruent-Parallel Side Theorem

Triangle Congruence Theorems:

- ASA
- SSS
- SAS
- CPCTC

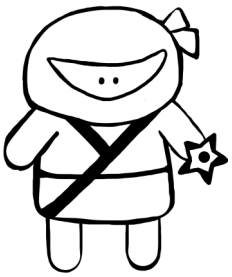
Lines:

- Reflective Property
- Midpoint Theorem
- Symmetric Property
- Transitive Property
- Definition of a Bisector

Angles:

- Alternate Interior Angles Theorem
- Alternate Interior Angle Converse Theorem
- Consecutive Interior Angles Theorem
- Alternate Interior Angles
- Corresponding Angles Theorem
- Reflective Property
- Symmetric Property
- Transitive Property
- Supplement Theorem (180°)
- Right angles are congruent
- Perpendicular lines form 4 right angles
- All right angles are congruent

★ **Hint**: *Prove that the triangles made within the parallelogram are congruent.*



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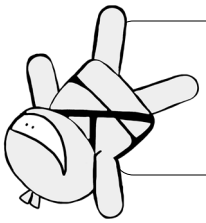
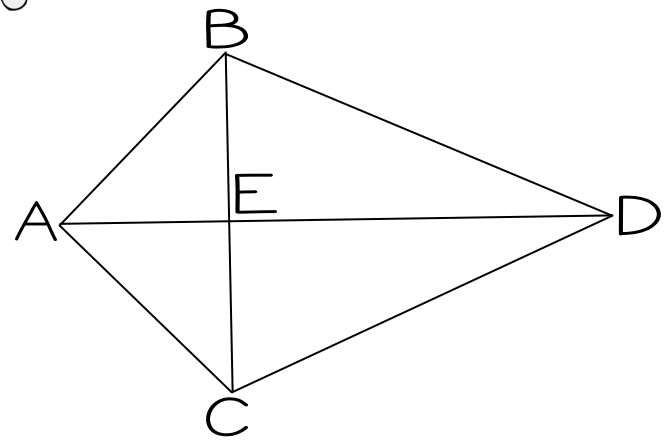


Kites



Helpful Definitions, Theorems, & Postulates

Kites:

- Definition of a Kite

  Diagonals intersect at point E

Triangle Congruence Theorems:

- ASA
- SSS
- SAS
- CPCTC

Lines:

- Reflective Property
- Midpoint Theorem
- Symmetric Property
- Transitive Property
- Definition of a Bisector

Angles:

- Alternate Interior Angles Theorem
- Alternate Interior Angle Converse Theorem
- Consecutive Interior Angles Theorem
- Alternate Interior Angles
- Corresponding Angles Theorem
- Reflective Property
- Symmetric Property
- Transitive Property
- Supplement Theorem (180°)
- Right angles are congruent
- Perpendicular lines form 4 right angles
- All right angles are congruent

★ **Hint**: *Prove that the triangles made within the kite are congruent.*

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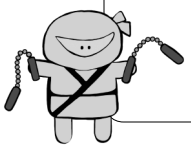
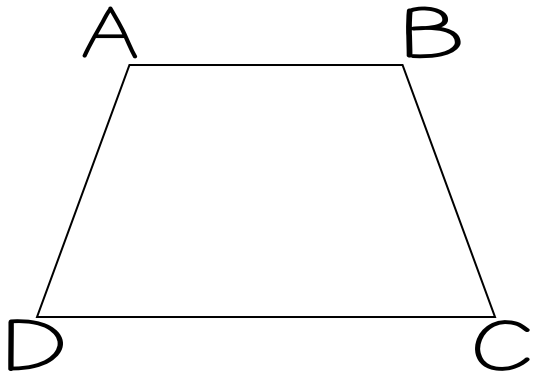


Trapezoids



Helpful Definitions, Theorems, & Postulates

Trapezoid:

- Definition of a Trapezoid
- Definition of an Isosceles Trapezoid

Parallelogram:

- Definition of a Parallelogram

Triangle Congruence Theorems:

- ASA
- SSS
- SAS
- CPCTC

Lines:

- Reflective Property
- Midpoint Theorem
- Symmetric Property
- Transitive Property
- Definition of a Bisector
- Definition of Parallel lines

Angles:

- Alternate Interior Angles Theorem
- Alternate Interior Angle Converse Theorem
- Consecutive Interior Angles Theorem
- Alternate Interior Angles
- Corresponding Angles Theorem
- Reflective Property
- Symmetric Property
- Transitive Property
- Supplement Theorem (180°)
- Right angles are congruent
- Perpendicular lines form 4 right angles
- All right angles are congruent
- Same Side Alternate Interior angles
- Base angles in isosceles triangles are congruent

★ **Hint:** *Look for isosceles trapezoid characteristics and for triangles to prove congruent sides*

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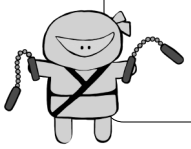
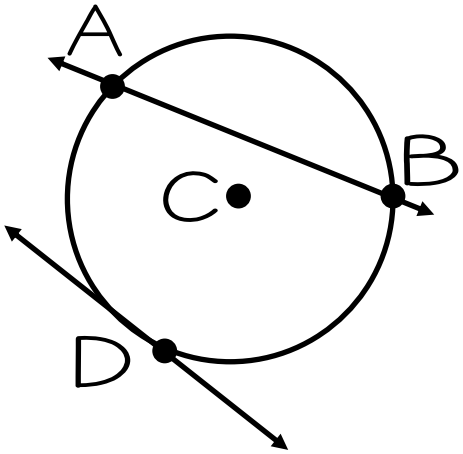
Geometry Proof ATTACK SHEET



Circles



Helpful Definitions, Theorems, & Postulates

- Definition of a chord
- Definition of a minor arc
- Definition of a major arc

Arcs

- Arc addition postulate
- Intercepted arc
- Adjacent arcs
- Substitution

Lines:

- Parallel Lines-Congruent Theorem
- Diameter-Chord Theorem
- Equidistant Chord Theorem
- Congruent Chord-Congruent Arc Theorem
- Segment Chord Theorem
- Tangent Segment Theorem
- External Secant Segment
- Secant Segment Theorem
- Secant Tangent Theorem

Angles:

- Inscribed Angle Theorem
- Central Angle Theorem
- Interior Angles of a Circle Theorem
- Exterior Angles of a Circle Theorem
- Tangent to a Circle Theorem
- Addition Property of Equality
- Subtraction Property of Equality
- Definition of a right angle
- Definition of supplementary
- Definition of complementary
- Triangle Sum Theorem (180°)

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