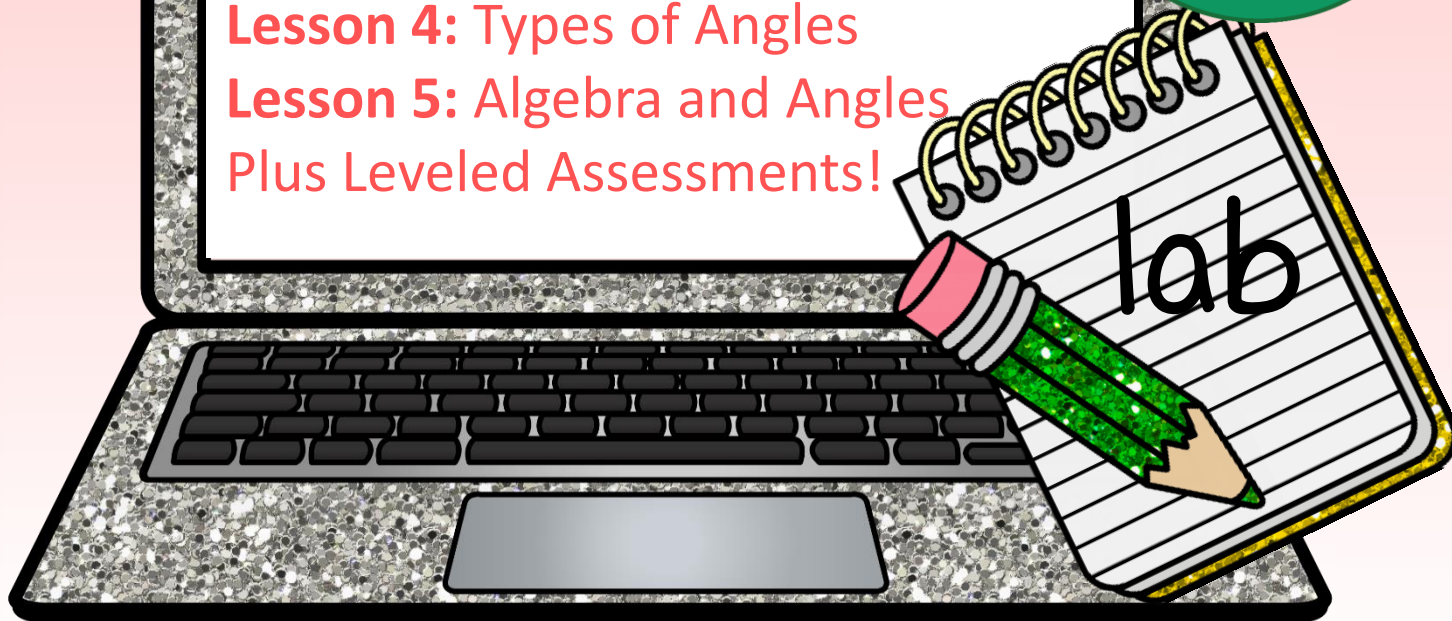# Geometry Unit 1
Vocabulary, tools & Intro to Proofs
Bundle

Digital Lessons with Paper & Pencil LABS

Lesson 1: Undefined Terms
Lesson 2: Geometric Vocabulary
Lesson 3 Lab*: Using Geometric Tools
Lesson 4: Types of Angles
Lesson 5: Algebra and Angles
Plus Leveled Assessments!

MATHBERRY LANE

lab

Unit 1: Geometric Vocabulary, Notation & Tools

Lesson 1: Undefined Terms & Learning to Draw Digitally

Lesson 2: Geometric Vocabulary

Lesson 3 Lab*: Using Geometric Tools

Lesson 4: Angle Pair Relationships

Lesson 5: Algebra and Angles

Unit Assessment:

2 Leveled Assessments aligned to Common Core

Answer Key

Scoring Rubric

Leveled Assessments

Unit 1 Assessment

Common Core State Standards:

CCSS.MATH.CONTENT.HSG.CO.A.1

Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

CCSS.MATH.CONTENT.HSG.CO.C.9

Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*

CCSS.MATH.CONTENT.HSG.CO.D.12

Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.*

CCSS.MATH.CONTENT.HSA.REI.A.1

Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

CCSS.MATH.CONTENT.7.G.B.5

Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

Leveled Assessments

Grading Rubrics

Answer Key

Aligned to Common Core

Unit 1: Geometric Vocabulary, Tools & Intro to Proofs

Lesson 1: Undefined Terms
Lesson 2: Geometry Vocabulary & Notation
Lesson 3 Lab*: Using Geometric Tools
Lesson 4: Angle Pair Relationships
Lesson 5: Algebra and Angles

LEVELED ASSESSMENTS: 14 EDITABLE PAGES

MATHBERRY LANE

Lesson 1: Undefined Terms: *Learning to draw digitally*

- This activity starts by identifying the three undefined terms in Euclidean geometry along with sample ways to notate each figure. The lesson continues to teach students how to draw and label each term in the lesson by using the drawing tools in google slides to create them. The lesson ends with a brief formative self assessment.

- If you would prefer for your students to not have the answers as they work, then simply delete the answer slides before sharing the file with your students.

- Note: Lesson format is compatible with Google slides®

- 27 slides; 3 instructional pages

- Estimated Instructional Time: 45 minutes

CCSS.MATH.CONTENT.HSG.CO.A.1

Lesson 2: Geometry Vocabulary: *learning to draw digitally*

- This resource defines essential geometry terms. Students then have the opportunity to practice drawing the figures in google slides. The lesson ends with a formative self assessment where students practice defining and classifying terms.

- If you would prefer for your students to not have the answers as they work, then simply delete the answer slides before sharing the file with your students.

- Note: Lesson format is compatible with Google slides®

- 31 slides; 4 instructional pages

- Estimated Instructional Time: 45 minutes

CCSS.MATH.CONTENT.HSG.CO.A.1

Lesson 3: Using Geometric Tools: Digital Lesson With Paper and Pencil Lab

- ## Materials needed

    compass; straightedge/ruler; string; mirror; paper/tracing paper; **printed paper and pencil lab handout**.

- If tracing paper is available, it may be easier for the paper folding activity. Or have students hold paper up to the light or a window.

- This lesson introduces using geometric tools. Students learn about the different types of geometric tools in google slides® and then practice using the tools by completing a paper and pencil lab. The lesson is differentiated by providing lots of choices for what to create.

CCSS.MATH.CONTENT.HSG.CO.A.1

CCSS.MATH.CONTENT.HSG.CO.D.12

Lesson 3: Continued...

- All geometric tools are practiced except for using geometric software.

- You can access a **free lesson** for using geometric software here:

> ### Getting Started with Geogebra

- Tip: The paper and pencil lab may be set up in stations for students to rotate through.

- 22 slides + 3 pages instructions+ 8 printables+3answer key

- Estimated Instructional Time: 40 minutes

Lesson 4: Angle Pair Relationships – Notes & Intro to Proof

- This reviews different angle pair relationships from grade 7 geometry:
  - Adjacent Angles
  - Complementary Angles
  - Supplementary Angles
  - Vertical Angles
  - Linear Pairs
- The lesson then continues to extend the vocabulary to key words for writing proofs, such as axiom, postulate, and theorem, followed by the angle addition postulate and segment addition postulate.
- Practice Digital Drawing with linear pairs and vertical angles
- Online exploration activities to discover that linear pairs form supplementary angles and that vertical angles have equal measure.

CCSS.MATH.CONTENT.7.G.B.5
CCSS.MATH.CONTENT.HSG.CO.C.9

Lesson 4: Continued...

- Students make conjectures based on the exploration followed by brainstorming how to prove their statement. Turn & talk to a neighbor to get the most brainstorming ideas.
- Students are walked through their very first set of proofs!
- The lesson ends with a quick formative self assessment recapping key aspects of the lesson.
- Practice exercises give students the opportunity to distinguish between statements and reasons, better preparing them to write proofs.
- Tip: use scrap paper or white boards for students to sketch figure on for processing or brainstorming.
- If you would not like your students to have the answers to grade as they go, simply delete those slides before sharing the file with your students.

- 43 slides + 4 pages instructions + 2 GeoGebra explorations
- Estimated Instructional Time: 45 minutes

Lesson 5: Algebra and Angles – Getting Ready for Proofs

- Pre-requisite skills:
  - Definition of Supplementary Angles; Vertical angles have equal measure; linear pairs are supplementary.
- This lesson reviews solving algebraic equations from Algebra with a slight twist. Students are asked to justify each step for solving the equation with a property of equality.
- The lesson continues to introduce the reflexive, symmetric and transitive properties of equality.
- Finally, students combine their algebra and geometry skills to solve for unknown angle measures.
- The lesson ends with a quick self assessment followed by practice problems to solve for missing angle measures.
- Note: Lesson format is compatible with Google slides®

- If you would not like your students to have the answers to grade as they go, simply delete those slides before sharing the file with your students.

- 52 slides + 4 pages instructions
- Estimated Instructional Time: 90 minutes

CCSS.MATH.CONTENT.HSA.REI.A.1

Undefined Geometric Terms:

Euclidean Geometry has 3 undefined terms.

Point

• A

Read as Point A
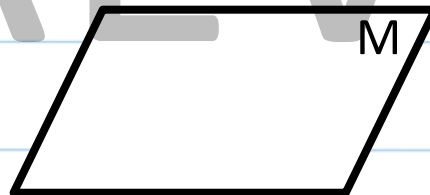
Line

B

A
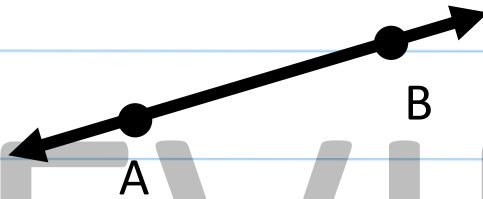
Read as line AB

Notation: $\overleftrightarrow{AB}$

Plane

M

Read as Plane M

Geometry Vocabulary:

Obtuse Angle: an angle that measures between 90° - 180°

Straight Angle: an angle that measures 180°

Right Angle: an angle that measures 90°

The box symbol indicates a right angle.

Reflex Angle: an angle that measures between 180° - 360°

Learning to Draw Digitally:

Your task is to draw a segment, ray and an angle. Each figure should be properly labeled.

The following slides provide directions for learning how to draw shapes in Google slides.

After reading through the directions for each figure, practice drawing and labeling them.

Digital Drawing: Segment

Lesson 2

Lesson 2 Geometry Vocabulary and Notation

File Edit View Insert Slide Format Arrange Tools Table Help All changes saved in Drive

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1

- T Text box
- Placeholder ▶
- 🖼 Image...
- 📊 Chart
- 🔗 Link... Ctrl+K
- 🎬 Video...
- A Word Art
- ＼ Line ▶
- 🔲 Shape ▶
- Table ▶
- Animation
- Slide numbers...
- 💬 Comment Ctrl+Alt+M

- ＼ Line
- ↘ Arrow
- ⌐ Elbow Connector
- ⌒ Curved Connector
- 🄢 Curve
- ⟨ Polyline

Go to >>Insert
>>Line
>>Lines

Click on the screen and hold the left button as you move the cursor to where you would like the other end of the segment to be.

Using Geometric Tools:

Required Materials:
- Compass
- Straightedge/Ruler
- Paper/Tracing paper
- String
- Mirror

Geometric Tools:

Compass: geometric tool used to construct circles and arcs

Straightedge: geometric tool used to draw segments and lines

Paper and Pencil Lab: Straightedge

Your task is to use a straightedge to draw one or more of the following:

- Triangle
- House
- Railroad tracks
- Honeycomb
- Clapperboard
- Stop sign
- Cube
- Or your own idea!

Lesson 4

Linear Pair Exploration

Problem 3: Find the angle measure of 4 different linear pairs.

Go to _____ web page.

>>Click on point D and move it to change the angle. Record 4 different angle measures on the next slide.

Linear Pair Exploration

D

72°   108°

A   B   C

Lesson 4
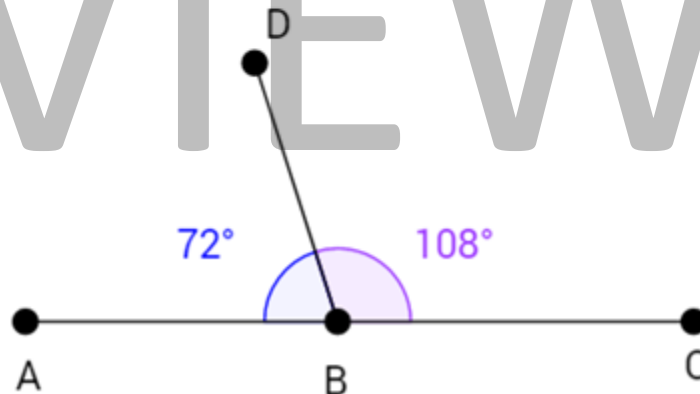
Set 1	Set 2	Set 3	Set 4
∠ABD =_____	m∠ABD =_____	m∠ABD =_____	m∠ABD =_____
∠CBD = _____	m∠CBD = _____	m∠CBD = _____	m∠CBD = _____

Make 2 or more observations about the angles and their measures.

Turn and talk to a neighbor to share observations. Based on the observations, make a conjecture about the sum of the two angles of a linear pair.

If two angles form a linear pair, then_____ .

? and ∠BEC are vertical angles.

...e fact that it is _____ .
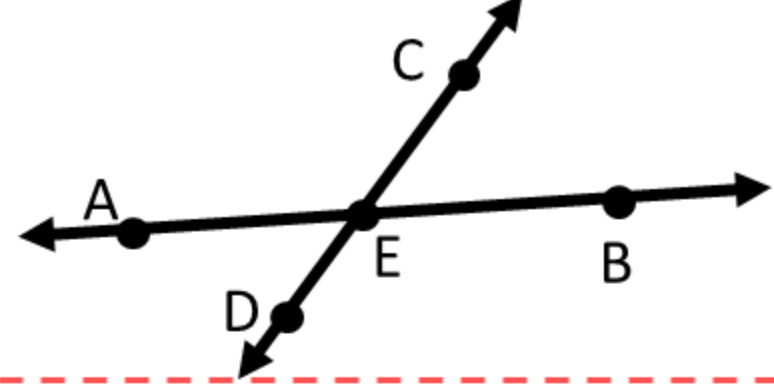
...know: m∠AED + m∠AEC = m∠DEC
...now: m∠CEB + m∠AEC = m∠AEB

...e _____ Postulate

We know m∠DEC= 180°
We know m∠AEB= 180°

By the definition of _____

Time to use that awesome brain power again! How can you use the substitution property of equality in the next step?

I'll get you started. Let's focus on what we know from above. Since we know...

m∠DEC=_____ and m∠DEC=_____ then it follows that...

m∠AED + m∠AEC=_____ by the _____ property of equality.

When solving, you undo what is done to the variable by REVERSING the order of operations.

When you SOLVE an equation you follow the order of operations in REVERSE order:

Solve →

Parenthesis
Exponents
Multiplication ⎫
Division ⎭ Undo Multiplication and Division

Addition ⎫
Subtraction ⎭ Undo Addition and Subtraction

Start by undoing Addition and Subtraction first!

Solving:

<u>Example</u>: Solve for x. $(3x+1) - 4 = 12$

Start by undoing –4 by adding 4 to each side.

...ght look like you should ... here, but don't undo what ...the parenthesis until you ...undone everything else.

$(3x+1) - 4 = 12$
$\ +4\ \ +4$
$3x+1 = 16$

Next we can undo +1 by adding 1 to each side.

$3x+1 = 16$ $32+5=37$
$-1\ \ \ -1$
$3x = 15$

Finish by dividing each side by 3 to undo multiplying by 3.

$$\frac{3x}{3} = \frac{15}{3}$$

$$x = 5$$

Solving: Find the missing angle.

Lesson 5

<u>Directions</u>: Solve for the missing angle below. Justify each step of your solution. An example is done for you!

<u>Example</u>:
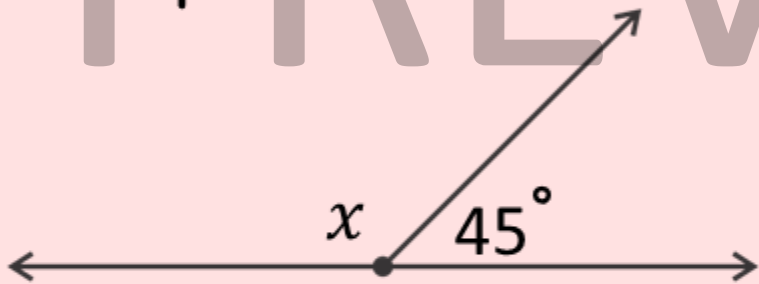
x $45°$

Justifications

$$x + 45 = 180$$ Linear pairs are supplementary.

$$-45 \qquad -45$$ Subtraction Property of Equality

$$x = 135°$$

actice

Exercise #2: Fill in the blanks to justify the solution below. Find the missing angle.
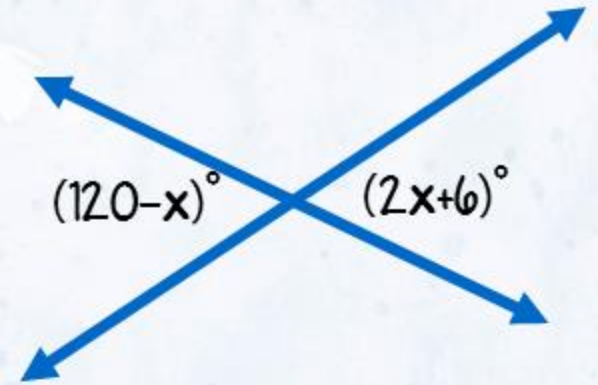
$(120-x)^\circ$ $(2x+6)^\circ$

Steps

Justifications

$(1\quad)^\circ = (2x+6)^\circ$

-6°

$(114-x)^\circ = (2x)^\circ$

$+x \qquad +x$

$\dfrac{114^\circ}{3} = \dfrac{3x^\circ}{3}$

$38^\circ = x^\circ$

Missing Angle $= (120-38)^\circ$

$= 82^\circ$

Digital GEOMETRY Curriculum:

✓ 1) **Geometry Vocabulary, Tools & Intro to Proofs**
Works In Progress..

2) Constructions

3) Parallel Lines & Equality Proofs

4) Transformations

5) Congruence

6) Similarity

7) Trigonometry and Right Triangles

8) Volume & Surface Area

9) Circles

10) Coordinate Geometry

11) Geometric Probability

Digital Lessons with Paper & Pencil LABS

Questions, comments, suggestions, and feedback for this product or others are appreciated.
My email address is admin@mathberrylane.com

fIND ME ON the WEB:

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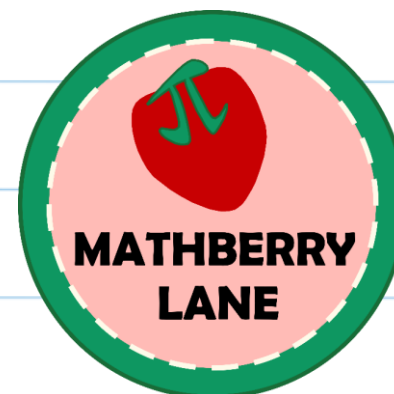
Credits for creating this product:

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