Educational Epiphany ™

Districtwide PLC Protocol for **Mathematics**

Teacher/Teacher Team: Mr. Samuel F.
Grade/Course: Geometry
Date: Week of September 11, 2023

#	Planning Question	Teacher/Teacher Team Response	
Geometry Coherence Tool: Access the foundational standards to make connections to previously taught skills during the lesson introduction.			
1	Which **state standard** is your lesson progression addressing?	**Lesson 2.3 – Postulates and Diagrams** **G.CO.C.8** Use definitions and theorems about lines and angles to solve problems and to justify relationships in geometric figures. **Foundational Standards:** 7.G.B.4, 8.G.A.2	**Lesson 2.4 – Algebraic Reasoning** **G.CO.C.8** Use definitions and theorems about lines and angles to solve problems and to justify relationships in geometric figures. **Foundational Standards:** 7.G.B.4, 8.G.A.2
2	What **mathematical concepts** are embedded in the state standard?	• Form conjectures about the relationships between lines and/or angles in geometric figures. • Use definitions and theorems about lines and angles to solve problems. • Use definitions and theorems about lines and angles to justify relationships in geometric figures.	
3	What teacher **knowledge, reminders, and misconceptions** are assumed in the standard?	**Knowledge:** • Formal proofs are not required in this course. Instead, the focus is on providing reasoning based on definitions and theorems to justify relationships and solutions. • Justifications using precise mathematical language and reasoning require practice and should be required of students throughout this course. This can include asking students "why?", "how do you know?", or to "explain your strategy." • Asking students to informally explain properties and relationships of lines and angles to justify answers to problems will help students learn to think more strategically and lead them to be more precise in their justifications. • Students should draw on their experiences with transformations and congruence as well as definitions and theorems within the scope of this course to both develop and justify conjectures about relationships of lines and angles. • Instruction should reinforce the need for precise mathematical language when sharing their reasoning both orally and in written form. It is particularly helpful to allow students to explain their reasoning to another student to verify their language before writing it down. This discussion will be mutually beneficial since each	**Knowledge:** • Formal proofs are not required in this course. Instead, the focus is on providing reasoning based on definitions and theorems to justify relationships and solutions. • Justifications using precise mathematical language and reasoning require practice and should be required of students throughout this course. This can include asking students "why?", "how do you know?", or to "explain your strategy." • Asking students to informally explain properties and relationships of lines and angles to justify answers to problems will help students learn to think more strategically and lead them to be more precise in their justifications. • Students should draw on their experiences with transformations and congruence as well as definitions and theorems within the scope of this course to both develop and justify conjectures about relationships of lines and angles. • Instruction should reinforce the need for precise mathematical language when sharing their reasoning both orally and in written form. It is particularly helpful to allow students to explain their reasoning to another student to verify their language before writing it down. This discussion will be mutually beneficial since each

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		student will have the opportunity to analyze another's reasoning as well as talk through their own. Sharing their reasoning and justifications whole group also allows students to hear and learn from the reasoning of others. **Reminders:** • Theorems introduced in this course about lines and angles build from basic understandings of their relationships. For example, students classified shapes based on the presence or absence of parallel and perpendicular lines in grade 4 (4.G.A.2), explored the relationships between specific pairs of angles in grade 7 (7.G.B.4), and learned which transformations result in congruent figures in grade 8 (8.G.A.1). This standard, G.CO.C.8, calls for students to make connections to this prior learning and apply it to other figures such as a pair of parallel lines cut by a transversal. This will help students conceptualize and mathematically justify these new relationships and use them to solve problems. **Misconceptions:** • Students often struggle with where to start with their explanation. Encouraging them to begin by stating what they know and identifying or making conjectures about any relationships that exist between the lines and/or angles in the figures can help them to get started.	student will have the opportunity to analyze another's reasoning as well as talk through their own. Sharing their reasoning and justifications whole group also allows students to hear and learn from the reasoning of others. **Reminders:** • Theorems introduced in this course about lines and angles build from basic understandings of their relationships. For example, students classified shapes based on the presence or absence of parallel and perpendicular lines in grade 4 (4.G.A.2), explored the relationships between specific pairs of angles in grade 7 (7.G.B.4), and learned which transformations result in congruent figures in grade 8 (8.G.A.1). This standard, G.CO.C.8, calls for students to make connections to this prior learning and apply it to other figures such as a pair of parallel lines cut by a transversal. This will help students conceptualize and mathematically justify these new relationships and use them to solve problems. **Misconceptions:** • Students often struggle with where to start with their explanation. Encouraging them to begin by stating what they know and identifying or making conjectures about any relationships that exist between the lines and/or angles in the figures can help them to get started.
4	What **objective(s)** must be taught? In what order? Why?	**PBO:** • **SWBAT** use definitions and theorems about lines and angles **IOT** solve problems and to justify relationships in geometric figures. **Lesson objectives**: • I can identify postulates represented by diagrams. • I can sketch a diagram given a verbal description. • I can interpret a diagram.	**PBO:** • **SWBAT** use definitions and theorems about lines and angles **IOT** solve problems and to justify relationships in geometric figures. **Lesson objectives:** • I can identify algebraic properties of equality. • I can use algebraic properties of equality to solve equations. • I can use properties of equality to solve for geometric measures.
5	What **academic language** must be taught before the teacher models for students? How will the academic language be **taught and assessed**?	**Academic Language:** • **Use** – take, hold, or apply • **Definition** – a statement of the exact meaning of a word • **Theorem** – a mathematical statement derived from proven results • **Solve** – to apply an operation(s) in order to find a value; to find an answer • **Justify** – to prove or show to be correct or reasonable • **Relationship** – connection between two or more things; the way in which two or more concepts are connected • **Geometric Figure** – the characteristic surface configuration of an object **Instructional Practice 2:**	**Academic Language:** • **Use** – take, hold, or apply • **Definition** – a statement of the exact meaning of a word • **Theorem** – a mathematical statement derived from proven results • **Solve** – to apply an operation(s) in order to find a value; to find an answer • **Justify** – to prove or show to be correct or reasonable • **Relationship** – connection between two or more things; the way in which two or more concepts are connected • **Geometric Figure** – the characteristic surface configuration of an object **Instructional Practice 2:**

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		Strategies used to teach unfamiliar words will include: • 30 – 30 – 30 (common math-related word parts in the text, problem or objective) • Point of Use Annotation of the Performance Based Objective • Universal Language of Literacy • Word and Definition Walls • Word Parts • Context Clues • Point of Use Annotation of the Text (in Real Time)	Strategies used to teach unfamiliar words will include: • 30 – 30 – 30 (common math-related word parts in the text, problem or objective) • Point of Use Annotation of Performance-Based Objective • Universal Language of Literacy • Word-and-Definition Word Walls • Word Parts • Context Clues • Point of Use Annotation of the Texts (In Real Time)
6	What **activities/practice problems** are you planning to use for **Launch the Lesson, Explore It, Examples & Self-Assessment, and Practice** portions of the lesson? What did you learn from working the problems **in advance** of using them in class with students?	**Technology Integration Suggestions: Big Ideas Platform** • Dynamic Classroom • Resources: Digital Example Videos • Resources: Everyday Connections Video Series • Lesson Example PowerPoints • Resources: Explorations (Dynamic) **For technology integration resources and suggestions, please click here.** **Monday 09/11/2023** Overton High School Geometry CFA #2 Assessment will be administered on Mastery Connect Standards G.CO.A.3 (Preparatory), G.CO.D.11, G.GPE.A.3 **Tuesday 09/12/2023** • School Picture Day • Completion of CFA #2	**Technology Integration Suggestions: Big Ideas Platform** • Dynamic Classroom • Resources: Digital Example Videos • Resources: Everyday Connections Video Series • Lesson Example PowerPoints • Resources: Explorations (Dynamic) **For technology integration resources and suggestions, please click here.** **Thursday 09/14/2023** **Do Now 09/12/2023 (5 minutes)** **Name: _____ Period _____** $\angle 1$ is a supplement of $\angle 2$, and $m\angle 2 = 27°$. Find $m\angle 1$. **Agenda** • Identify algebraic properties of equality • Use algebraic properties of equality to solve equations • Use properties of equality to solve for geometric measures **PBO** • 30 – 30 – 30 (common math-related word parts in the text, problem or objective)

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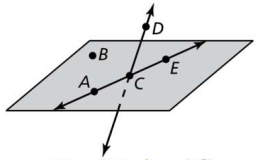
Wednesday 09/13/2023

Do Now 09/11/2023 **(5 minutes)**

Name: _____ **Period** __

1. **Use the diagram.**
   Name a point that is not coplanar with points A, B, and E.

   _____



2. **Use the diagram.**
   Name a point that is collinear with points A and C.

   _____

Agenda

- Identify postulates represented by diagrams
- Sketch a diagram given a verbal description
- Interpret a diagram

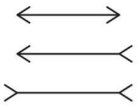
PBO

- 30 – 30 – 30 (common math-related word parts in the text, problem or objective)
- Point of Use Annotation of the Performance Based Objective
- Universal Language of Literacy
- Word and Definition Walls
- Word Parts

Laurie's Notes

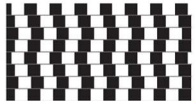
Launch the Lesson

Optical Illusions



Compare the lengths of the three segments. What do you notice about the measures?

Answer: _____



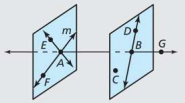
Compare the horizontal segments. Can you trust your eyes? One student says the segments are parallel, another student says they are not.

Answer: _____

- Point of Use Annotation of the Performance Based Objective
- Universal Language of Literacy
- Word and Definition Walls
- Word Parts

Refresh

In Exercises 40–43, use the diagram to determine whether you can assume the statement.



40. Points D, B, and C are coplanar.

41. $m\angle DBG = 90°$

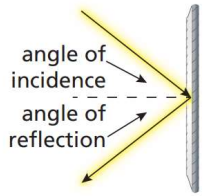
42. Line m intersects $\overleftrightarrow{AB}$ at point A.

43. $\overleftrightarrow{DC}$ lies in plane DBC.

Laurie's Notes

Launch the Lesson

- "Sketch what a light beam reflecting off a mirror looks like."
- Point out the angle of incidence and angle of reflection.



Compare the angle of incidence and angle of reflection. What do you notice?

EXPLORE IT! Justifying Steps in a Solution

Work with a partner. In previous courses, you studied different properties, such as the properties of equality and the Distributive, Commutative, and Associative Properties. You can use these properties to help solve equations.

a. A student solves the equation $\frac{5}{2}(x + 4) - 6 = 5x + 9$ as shown. Justify each step in the solution.

$\frac{5}{2}(x+4)-6=5x+9$

Algebraic Step	Justification
$\frac{5}{2}(x+4)-6=5x+9$	Write given equation.
$\frac{5}{2}x+10-6=5x+9$	_____
$\frac{5}{2}x+4=5x+9$	_____
$\frac{5}{2}x-\frac{5}{2}x+4=5x-\frac{5}{2}x+9$	_____
$4=\frac{5}{2}x+9$	_____
$4-9=\frac{5}{2}x+9-9$	_____
$-5=\frac{5}{2}x$	_____
$\frac{2}{5}\cdot(-5)=\frac{2}{5}\cdot\frac{5}{2}x$	_____
$-2=x$	_____

b. Identify another method you can use to solve the equation in part (a). Use this method to solve and justify each step. Then compare your method with the one in part (a) and the methods used by your classmates.

c. Solve $3(x + 1) - 1 = -13$ using two different methods. Justify each step for each method. Compare your answers with those of your classmates.

d. How can algebraic properties help you solve an equation?

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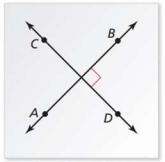
EXPLORE IT! Interpreting Diagrams



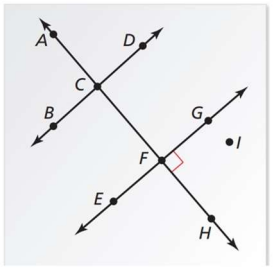
view from above

view from upper right

Work with a partner.

a. On a piece of paper, draw two perpendicular lines. Label them $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$. Look at the diagram from different angles. Do the lines appear perpendicular regardless of the angle at which you look at them? Describe *all* the angles at which you can look at the lines and have them appear perpendicular.

b. When you draw a diagram, you are communicating with others. It is important that you include sufficient information in the diagram. Use the diagram below to determine which of the following statements you can assume to be true. Explain your reasoning.



i. Points D, G, and I are collinear.

ii. Points A, C, and H are collinear.

iii. $\overleftrightarrow{EG}$ and $\overleftrightarrow{AH}$ are perpendicular.

iv. $\overleftrightarrow{AF}$ and $\overleftrightarrow{BD}$ are perpendicular.

v. $\overleftrightarrow{AF}$ and $\overleftrightarrow{BD}$ are coplanar.

vi. $\overleftrightarrow{EG}$ and $\overleftrightarrow{BD}$ do not intersect.

vii. $\overleftrightarrow{AF}$ and $\overleftrightarrow{BD}$ intersect.

viii. $\overleftrightarrow{AC}$ and $\overleftrightarrow{FH}$ are the same line.

Identifying Postulates

Here are seven more postulates involving points, lines, and planes.

POSTULATES

Point, Line, and Plane Postulates

Postulate	Example
2.1 Two Point Postulate Through any two points, there exists exactly one line.	
2.2 Line-Point Postulate A line contains at least two points.	Through points A and B, there is exactly one line ℓ. Line ℓ contains at least two points.

Using Algebraic Properties

When you *solve an equation*, you use properties of real numbers. Segment lengths and angle measures are real numbers, so you can also use these properties to write logical arguments about geometric figures.

KEY IDEA

Algebraic Properties

Let a, b, and c be real numbers.

Addition Property of Equality	If $a = b$, then $a + c = b + c$.
Subtraction Property of Equality	If $a = b$, then $a - c = b - c$.
Multiplication Property of Equality	If $a = b$, then $a \cdot c = b \cdot c$, $c \neq 0$.
Division Property of Equality	If $a = b$, then $\frac{a}{c} = \frac{b}{c}$, $c \neq 0$.
Substitution Property of Equality	If $a = b$, then a can be substituted for b (or b for a) in any equation or expression.
Distributive Property	**Sum** $a(b + c) = ab + ac$ **Difference** $a(b - c) = ab - ac$

EXAMPLE 1 Justifying Steps

Solve $3x + 2 = 23 - 4x$. Justify each step.

SOLUTION

Equation	Explanation	Reason
$3x + 2 = 23 - 4x$	Write the equation.	Given
$3x + 2 + 4x = 23 - 4x + 4x$	Add $4x$ to each side.	Addition Property of Equality
$7x + 2 = 23$	Combine like terms.	Simplify.
$7x + 2 - 2 = 23 - 2$	Subtract 2 from each side.	Subtraction Property of Equality
$7x = 21$	Combine constant terms.	Simplify.
$x = 3$	Divide each side by 7.	Division Property of Equality

REMEMBER

Inverse operations "undo" each other. Addition and subtraction are inverse operations. Multiplication and division are inverse operations.

REMEMBER

Be sure to always check your solutions.

EXAMPLE 2 Justifying Steps WATCH

Solve $-5(7w + 8) = 30$. Justify each step.

SOLUTION

Equation	Explanation	Reason
$-5(7w + 8) = 30$	Write the equation.	Given
$-35w - 40 = 30$	Multiply.	Distributive Property
$-35w = 70$	Add 40 to each side.	Addition Property of Equality
$w = -2$	Divide each side by -35.	Division Property of Equality

▶ The solution is $w = -2$.

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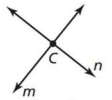
2.3 Line Intersection Postulate

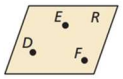
If two lines intersect, then their intersection is exactly one point.



The intersection of line m and line n is point C.

2.4 Three Point Postulate

Through any three noncollinear points, there exists exactly one plane.



Through points D, E, and F, there is exactly one plane, plane R. Plane R contains at least three noncollinear points.

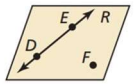
2.5 Plane-Point Postulate

A plane contains at least three noncollinear points.

Through points D, E, and F, there is exactly one plane, plane R. Plane R contains at least three noncollinear points.

2.6 Plane-Line Postulate

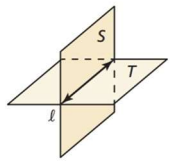
If two points lie in a plane, then the line containing them lies in the plane.



Points D and E lie in plane R, so $\overleftrightarrow{DE}$ lies in plane R.

2.7 Plane Intersection Postulate

If two planes intersect, then their intersection is a line.



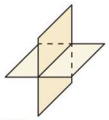
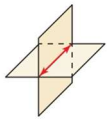
The intersection of plane S and plane T is line ℓ.

EXAMPLE 1 Identifying a Postulate Using a Diagram

State the postulate illustrated by the diagram.

WATCH

a. If  then 

b. If  then 

SOLUTION

a. Line Intersection Postulate If two lines intersect, then their intersection is exactly one point.

b. Plane Intersection Postulate If two planes intersect, then their intersection is a line.

EXAMPLE 3 Modeling Real Life

You get a raise at your part-time job. To write your raise as a percent, use the formula $p(r + 1) = n$, where p is your previous wage, r is the percent increase (as a decimal), and n is your new wage. Solve the formula for r. What is your raise written as a percent when your hourly wage increases from \$7.25 to \$7.54 per hour?

SOLUTION

Step 1 Solve for r in the formula $p(r + 1) = n$.

Equation	Explanation	Reason
$p(r + 1) = n$	Write the equation.	Given
$pr + p = n$	Multiply.	Distributive Property
$pr = n - p$	Subtract p from each side.	Subtraction Property of Equality
$r = \frac{n - p}{p}$	Divide each side by p.	Division Property of Equality

Step 2 Evaluate $r = \frac{n - p}{p}$ when $n = 7.54$ and $p = 7.25$.

$$r = \frac{n - p}{p} = \frac{7.54 - 7.25}{7.25} = \frac{0.29}{7.25} = 0.04$$

▶ Your raise is 4%.

SELF-ASSESSMENT 1 I do not understand. 2 I can do it with help. 3 I can do it on my own. 4 I can teach someone else.

Solve the equation. Justify each step.

1. $6x - 11 = -35$
2. $-2p - 9 = 10p - 17$
3. $39 - 5z = -1 + 5z$
4. $3(3x + 14) = -3$
5. $4 = -10b + 6(2 - b)$
6. $-3(2r - 5) = 2(9 - 4r)$
7. Solve the formula $A = \frac{1}{2}bh$ for b. Justify each step. Then find the base of a triangle whose area is 952 square feet and whose height is 56 feet.

2.4 Practice WITH CalcChat® AND CalcView®

GO DIG

In Exercises 1 and 2, write the property that justifies each step.

1. $3x - 12 = 7x + 8$ Given
   $-4x - 12 = 8$ _____
   $-4x = 20$ _____
   $x = -5$ _____
2. $5(x - 1) = 4x + 13$ Given
   $5x - 5 = 4x + 13$ _____
   $x - 5 = 13$ _____
   $x = 18$ _____

In Exercises 15–20, solve the equation for y. Justify each step.

15. $5x + y = 18$
16. $-4x + 2y = 8$
17. $2y + 0.5x = 16$
18. $\frac{1}{2}x - \frac{3}{4}y = -2$
19. $12 - 3y = 30x + 6$
20. $3x + 7 = -7 + 9y$

In Exercises 21–24, solve the formula for the given variable. Justify each step.

21. $C = 2\pi r$; r
22. $I = Prt$; P
23. $S = 180(n - 2)$; n
24. $S = 2\pi r^2 + 2\pi rh$; h

Exit Ticket

2.4 Practice – Problem 20

Friday 09/15/2023

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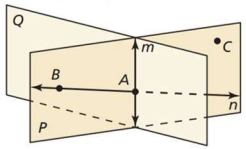
EXAMPLE 2 **Identifying Postulates from a Diagram**

Use the diagram to write examples of the Plane-Point Postulate and the Plane-Line Postulate.



SOLUTION

Plane-Point Postulate Plane P contains at least three noncollinear points, A, B, and C.

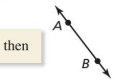
Plane-Line Postulate Point A and point B lie in plane P. So, line n containing points A and B also lies in plane P.

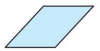
SELF-ASSESSMENT 1 I do not understand. 2 I can do it with help. 3 I can do it on my own. 4 I can teach someone else.

1. In the diagram in Example 2, which postulate allows you to say that the intersection of plane P and plane Q is a line?
2. Use the diagram in Example 2 to write an example of each postulate.
   a. Two Point Postulate
   b. Line-Point Postulate
   c. Line Intersection Postulate
3. **WRITING** Explain why at least three noncollinear points are needed to determine a plane.

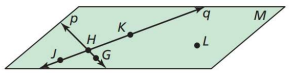
2.3 Practice WITH CalcChat® AND CalcView®

In Exercises 1 and 2, state the postulate illustrated by the diagram. *Example 1*

1. If ● A ● B then 

2. If  then 

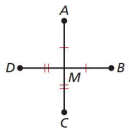
In Exercises 3–6, use the diagram to write an example of the postulate. *Example 2*



3. Line-Point Postulate
4. Line Intersection Postulate
5. Three Point Postulate
6. Plane-Line Postulate

13. Points Q, J, and M are collinear.
14. $\overleftrightarrow{MN}$ and $\overleftrightarrow{RP}$ intersect.
15. $\overleftrightarrow{JK}$ lies in plane X.
16. $\angle PLK$ is a right angle.
17. $\angle NKL$ and $\angle JKM$ are vertical angles.
18. $\angle NKJ$ and $\angle JKM$ are supplementary angles.

ERROR ANALYSIS **In Exercises 19 and 20, describe and correct the error in the statement made about the diagram.**



19. ✗ M is the midpoint of $\overline{AC}$ and $\overline{BD}$.
20. ✗ $\overline{AC}$ intersects $\overline{BD}$ at a 90° angle, so $\overline{AC} \perp \overline{BD}$.

Exit Ticket
Exercise 2.3 Problems 19 & 20

Do Now 09/15/2023 (5 minutes)

Name: _____ Period __

Solve the equation. Justify each step.

$$3(4x + 7) = 5(3x + 3)$$

Agenda

- Use algebraic properties of equality to solve equations
- Use properties of equality to solve for geometric measures
- Use other properties of equality

PBO

- 30 – 30 – 30 (common math-related word parts in the text, problem or objective)
- Point of Use Annotation of the Performance Based Objective
- Universal Language of Literacy
- Word and Definition Walls
- Word Parts

Launch the Lesson (From the Key Ideas)

- What does the substitution property of equality mean to you?
- What does **5 = 5** mean to you?
- If **x = 5**, is **x = 5**?
- If **x = 9** and **y = 9**, is **x = y**?

Using Other Properties of Equality

The following properties of equality are true for all real numbers. Segment lengths and angle measures are real numbers, so these properties of equality are true for all segment lengths and angle measures.

KEY IDEAS

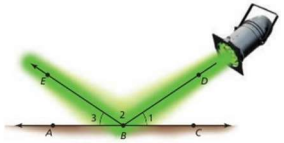
Reflexive, Symmetric, and Transitive Properties of Equality

	Real Numbers	Segment Lengths	Angle Measures
Reflexive Property	$a = a$	$AB = AB$	$m\angle A = m\angle A$
Symmetric Property	If $a = b$, then $b = a$.	If $AB = CD$, then $CD = AB$.	If $m\angle A = m\angle B$, then $m\angle B = m\angle A$.
Transitive Property	If $a = b$ and $b = c$, then $a = c$.	If $AB = CD$ and $CD = EF$, then $AB = EF$.	If $m\angle A = m\angle B$ and $m\angle B = m\angle C$, then $m\angle A = m\angle C$.

Additional supporting and prerequisites standards are indicated on the curriculum map. In addition, this is not a comprehensive breakdown of each lesson for this weekly PLC protocol guide.

EXAMPLE 4 **Using Properties of Equality with Angle Measures**

You reflect the beam of a spotlight off a mirror lying flat on a stage, as shown. Determine whether $m\angle DBA = m\angle EBC$.



SOLUTION

Equation	Explanation	Reason
$m\angle 1 = m\angle 3$	Marked in diagram.	Given
$m\angle DBA = m\angle 3 + m\angle 2$	Add measures of adjacent angles.	Angle Addition Postulate
$m\angle DBA = m\angle 1 + m\angle 2$	Substitute $m\angle 1$ for $m\angle 3$.	Substitution Property of Equality
$m\angle 1 + m\angle 2 = m\angle EBC$	Add measures of adjacent angles.	Angle Addition Postulate
$m\angle DBA = m\angle EBC$	Both measures are equal to the sum $m\angle 1 + m\angle 2$.	Transitive Property of Equality

SELF-ASSESSMENT 1 I do not understand. 2 I can do it with help. 3 I can do it on my own. 4 I can teach someone else.

Name the property of equality that the statement illustrates.

8. If $m\angle 6 = m\angle 7$, then $m\angle 7 = m\angle 6$.

9. If $JK = KL$ and $KL = 16$, then $JK = 16$.

10. $m\angle 1 = m\angle 2$ and $m\angle 2 = m\angle 5$. So, $m\angle 1 = m\angle 5$.

11. $ZY = ZY$

12. In Example 5, a hot dog stand is located halfway between the shoe store and the pizza shop, at point H. Show that $PH = HM$.

Practice 2.4

25. **REWRITING A FORMULA** The formula for the perimeter P of a rectangle is

$$P = 2\ell + 2w$$

where ℓ is the length and w is the width. Solve the formula for ℓ. Justify each step. Then find the length of a rectangular lawn with a perimeter of 32 meters and a width of 5 meters. *Example 3*

26. **REWRITING A FORMULA** The formula for the area A of a trapezoid is

$$A = \frac{1}{2}h(b_1 + b_2)$$

where h is the height and b_1 and b_2 are the lengths of the two bases. Solve the formula for b_1. Justify each step. Then find the length of one of the bases of the trapezoid when the area of the trapezoid is 91 square meters, the height is 7 meters, and the length of the other base is 20 meters.

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			In Exercises 27–34, name the property of equality that the statement illustrates. **27.** If $x = y$, then $3x = 3y$. **28.** If $AM = MB$, then $AM + 5 = MB + 5$. **29.** $x = x$ **30.** If $x = y$, then $y = x$. **31.** If $m\angle A = 29°$ and $m\angle B = 29°$, then $m\angle A = m\angle B$. **32.** $m\angle Z = m\angle Z$ **33.** If $AB = LM$, then $LM = AB$. **34.** If $BC = XY$ and $XY = 8$, then $BC = 8$. **Exit Ticket** 2.4 Practice – Problems 31 - 34
7	What **manipulatives** might be integrated into the lesson? What did you learn from using the manipulatives **in advance** of using them in class with students?	Compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, protractor, etc. **Reference:** Interactive Manipulatives • Didax Virtual Manipulatives	Compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, protractor, etc. **Reference:** Interactive Manipulatives • Didax Virtual Manipulatives
8	What **graphic organizer(s)** might support students' conceptual understanding of the process outlined by the performance-based objective(s)?	**Reference:** • Graphic Organizer Templates • Google Drawing Graphic Organizers • Teacher Vision	**Reference:** • Graphic Organizer Templates • Google Drawing Graphic Organizers • Teacher Vision

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