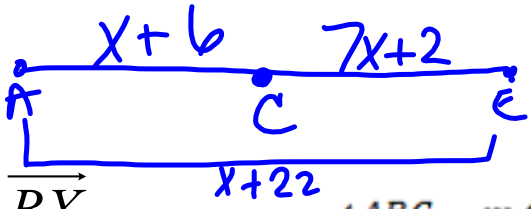
Warm-up- Complete problems below

1. Point C is located between points A and E. Determine the value of x if CE = 7x + 2 , AC = x + 6, and AE=x + 22.



$\overline{AC}+\overline{CE}=\overline{AE}$

$X+6+7X+2=X+22$

$8X+8=X+22$

$-X \quad -X$

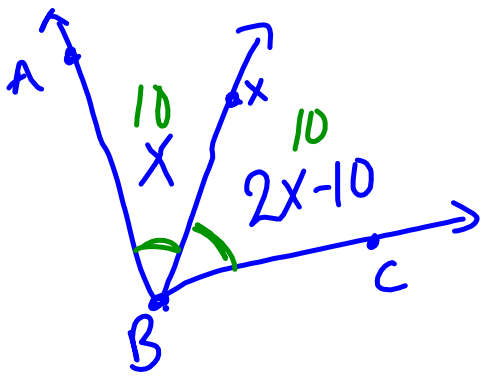
$7X+8=22$

$-8 \quad -8$

$7X=14$

$X=2$

2. $\overrightarrow{BX}$ is the BISECTOR of $\angle ABC$. If $m\angle ABX = x$ and $m\angle XBC = 2x - 10$, find the $m\angle ABC$.



$X=2X-10$

$-2X \quad -2X$

$-1X=-10$

$\frac{-1}{-1} \quad \frac{-10}{-1}$

$X=10$

$X=2X-10$

$-X \quad -X$

$0=X-10$

$+10 \quad +10$

$10=X$

$m\angle ABC=20^\circ$

Quiz-Time

You have 40 minutes to complete the quiz.

Intro to Proofs (Algebraic)

1. Solve the following equation.
Justify each step as you solve it.

$2(4x - 3) - 8 = 4 + 2x$	
$8x - 6 - 8 = 4 + 2x$	Distribute
$8x - 14 = 4 + 2x$ $-2x \quad -2x$	Combine like terms
$6x - 14 = 4$ $+14 \quad +14$	Subtract 2x
$6x = 18$ $\frac{}{6} \quad \frac{}{6}$	Add 14
$x = 3$	Divide by 6

2. Rewrite your proof so it is "formal" proof.

$2(4x - 3) - 8 = 4 + 2x$	
$8x - 6 - 8 = 4 + 2x$	Distributive Property
$8x - 14 = 4 + 2x$	Combine like terms
$6x - 14 = 4$	Subtraction Property of equality
$6x = 18$	Addition Property of equality
$x = 3$	Division Property of equality

When writing an algebraic proof, you create a chain of logical steps that move from the hypothesis to the conclusion of the conjecture you are proving. By proving the conclusion is true, you have proven the original conjecture is true.

When writing a proof, it is important to justify each logical step with a reason. You can use symbols and abbreviations, but they must be clear enough so that anyone who reads your proof will understand them.

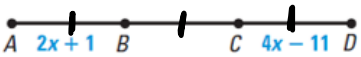
Two Column Proofs

• _____	
• _____	
• _____	

Bridging from Algebraic to Geometric

Practice #1:

GIVEN ▶ $\overline{AB} \cong \overline{BC}$, $\overline{CD} \cong \overline{BC}$



PROVE: x = 6

What Is the length of $\overline{AB}$?

$2x+1$

What Is the length of $\overline{CD}$?

$4x-11$

$2x+1=4x-11$
$-4x \quad -4x$
$-2x+1=-11$
$-1 \quad -1$
$-2x=-12$
$\frac{-2x}{-2}=\frac{-12}{-2}$
$x=6$

STATEMENTS	REASONS
$\overline{AB}\cong\overline{BC}, \overline{CD}\cong\overline{BC}$	Given
$\overline{AB}=2x+1 \quad \overline{CD}=4x-11$	Given
$\overline{AB}\cong\overline{CD}$	Transitive Property
$2x+1=4x-11$	Substition
$-2x+1=-11$	Subtraction prop of =
$-2x=-12$	Sub. prop. of =
$x=6$	Divis prop. of =

Practice #2:

GIVEN ▶ $\overline{ST} \cong \overline{SR}, \overline{QR} \cong \overline{SR}$

PROVE: x = 1

$x+4 = 5(3x-2)$

$x+4 = 15x-10$

$-15x \quad -15x$

$-14x+4 = -10$

$-4 \quad -4$

$-14x = -14$

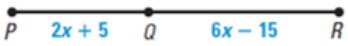
$\frac{-14x}{-14} = \frac{-14}{-14}$

$x = 1$

STATEMENTS	REASONS
$\overline{ST} \cong \overline{SR}$ $\overline{QR} \cong \overline{SR}$	Given
$\overline{QR} = x+4$ $\overline{ST} = 5(3x-2)$	Given
$\overline{QR} = \overline{ST}$	Transitive
$x+4 = 5(3x-2)$	Substitution
$x+4 = 15x-10$	Dist. prop.
$-14x+4 = -10$	Sub. prop of =
$-14x = -14$	Sub. prop of =
$x = 1$	Div. prop. of =

Practice: #3

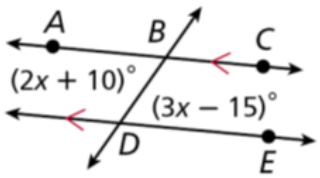
. **GIVEN** ▶ $PR = 46$



Prove: x = 7

STATEMENTS	REASONS
$\overline{PR} = 46$	Given
$\overline{PQ} = 2x+5$ $\overline{QR} = 6x-15$	Given
$\overline{PQ} + \overline{QR} = \overline{PR}$	Segment Addition
$2x+5+6x-15 = 46$	Substitution
$8x-10 = 46$	Combine like terms
$8x = 56$	Add. prop. of =
$x = 7$	Divisin prop. of =

Practice: #4



Prove: $m\angle DBC = 120°$

GIVEN: ∠ABD and ∠BDE are alternate interior angles.

STATEMENTS	REASONS
	Given
∠ABD = 2x+10 ∠BDE = 3x-15	Given
∠ABD = ∠BDE	Alt. interior ∠s are ≅
2x+10 = 3x-15	Substitution prop.
-1x+10 = -15	Sub. Prop of =
-1x = -25	Sub Prop of =
x = 25	division prop of =
m∠ABD = 60	substitution
m∠ABD + m∠DBC = 180	Def of linear pair
60 + m∠DBC = 180	substition
m∠DBC = 120	subtraction.

Practice: #5

GIVEN: $\overline{WX} = \overline{YZ}$
Y is the midpoint of $\overline{XZ}$.

Prove: $\overline{WX} = \overline{XY}$

STATEMENTS	REASONS
$\overline{WX} = \overline{YZ}$	Given
Y is midpt of $\overline{XZ}$	Given
$\overline{XY} = \overline{YZ}$	Def. of midpt
$\overline{WX} = \overline{XY}$	Transitive prop.