

1. Solve this equation. Justify the steps.

$$4x + 7 - x + 3 = 34$$

Steps	Reasons
$4x + 7 - x + 3 = 34$	Given
$3x + 10 = 34$	Simplify
$3x = 24$	subtr. prop.
$x = 8$	division prop.

2. Solve this equation. Justify the steps.

$$5 - 4(2x - 3) = -15$$

Steps	Reasons
$5 - 4(2x - 3) = -15$	Given
$5 - 8x + 12 = -15$	Distr. prop
$-8x + 17 = -15$	Simplify
$-8x = -32$	subtr. prop
$x = 4$	division prop.

3. If $EF = 2x - 5$, $FG = 4x - 8$, and $EG = 29$, find the values of x , EF , and FG . The drawing is not to scale.



$2x - 5$ $4x - 8$
 ⑨ ②⑩
 $6x - 13 = 29$
 $6x = 42$
 $x = 7$

4.

x	$w(x)$	$t(x)$
1	-1	-3
2	3	-1
3	4	1
4	3	3
5	-1	5

-4
2

The table above shows some values of the functions w and t . For which value of x is $w(x) + t(x) = x$?

- A) 1
- B) 2
- C) 3
- D) 4

5. If $x = \frac{2}{3}y$ and $y = 18$, what is the value of $2x - 3$?

- A) 21
- B) 15
- C) 12
- D) 10

$$x = \frac{2}{3}(18) = 12$$

$$2(12) - 3 = 21$$

6. If $\sqrt{x} + \sqrt{9} = \sqrt{64}$, what is the value of x ?

- A) $\sqrt{5}$
- B) 5
- C) 25
- D) 55

$$\sqrt{x} + 3 = 8$$

$$(\sqrt{x}) = 5$$

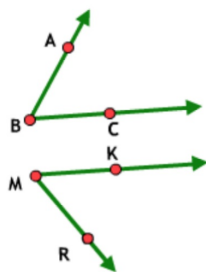
$$x = 25$$

4. Use a property of equality to justify each of the following statements.



If $QR = ST$, then
 $QR + BC = ST + BC$.

a. _____



If $m\angle ABC = m\angle KMR$,
 then $m\angle KMR = m\angle ABC$.

b. _____



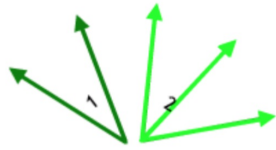
$AX = AX$

c. _____



If $m\angle 1 = m\angle 2$ and $m\angle 2 = m\angle 3$,
 then $m\angle 1 = m\angle 3$.

d. _____



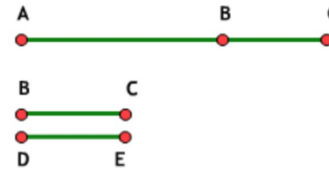
If $2 \cdot m\angle 1 = m\angle 2$,
then $m\angle 1 = \frac{m\angle 2}{2}$.



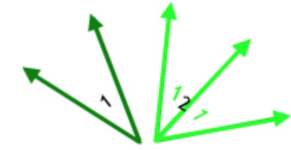
If $JK + AB = RQ + AB$,
then $JK = RQ$.

e. _____

f. _____



From the diagram, $AB + BC = AC$.
If $BC = DE$, then $AB + DE = AC$.



If $m\angle 1 = \frac{1}{2} \cdot m\angle 2$,
then $2 \cdot m\angle 1 = m\angle 2$.

g. _____

h. _____

Deductive reasoning, logic, and proof

Student Activity Sheet 3; Exploring "Creating proofs"

Page 1 of 6

1. Write a definition for a **postulate**.

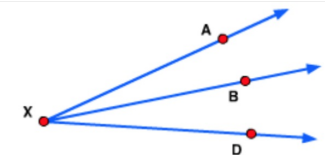
a statement that is
believed to be true &
accepted w/o proof.

2. Points A, Z, and B lie on \overline{AB} . If $AZ = 2$ centimeters and $ZB = 3$ centimeters, what is AB ? Explain how you found your answer.



3. Now consider a similar question involving angles.

Given the angles shown in the diagram, if $m\angle AXB = 15^\circ$ and $m\angle BXD = 20^\circ$, what is $m\angle AXD$?
On what assumptions are you basing your answer?



4. Use the given answer choices to complete the statements.

ZB	$m\angle BXD$	$m\angle AXD$	AB	$m\angle AXB$	AZ
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Segment Addition Postulate:

If Z is between A and B, then

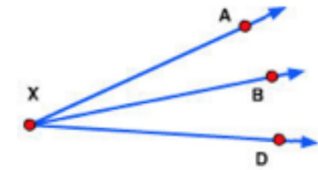
_____ + _____ = _____.



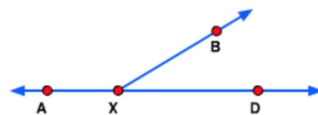
Angle Addition Postulate:

If B is in the interior of $\angle AXD$, then

_____ + _____ = _____.



5. Here is an application of the Angle Addition Postulate. In the diagram, $\angle AXD$ is a straight angle because A, X, and D are collinear. B is in the interior of $\angle AXD$. The questions below will lead you through a deductive argument about a special relationship between the angles in this diagram.



a. Given that $\angle AXD$ is a straight angle, what do you know about its measure? How do you know?

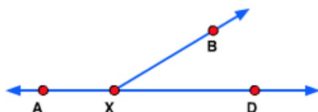
b. Because you know that B is in the interior of $\angle AXD$, what does the Angle Addition Postulate tell you about the angles?

c. Now you know two things that are equal to $m\angle AXD$. How can you use the Transitive Property of Equality to combine these statements?

d. What do you call angles whose measures sum to 180° ? Which two angles have this property?

6. Write a definition for a **theorem**.

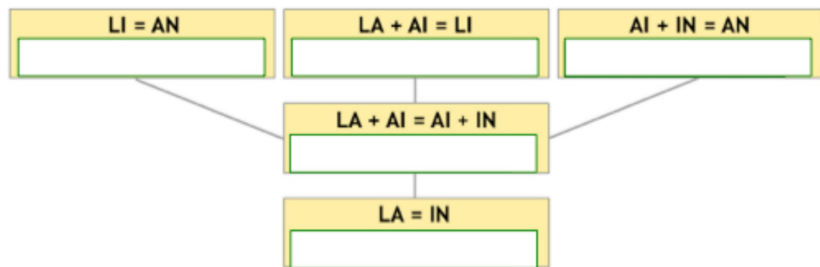
7. $\angle AXB$ and $\angle BXD$ are special angles called a linear pair. A linear pair is made up of two adjacent angles that form a straight angle. Using what you learned in questions 4 and 5, write a theorem about linear pairs.



8. Using the answer choices provided, fill in the correct reasons for each of the statements in this flow-chart proof.

Substitution Property	Division Property	Angle Addition Property	Multiplication Property
Subtraction Property	Segment Addition Postulate	Addition Property	Given

Given: $LI = AN$
Prove: $LA = IN$



9. Using the answer choices provided, fill in the correct reasons for each of the statements in this two-column proof.

$AI = AN$	$LI = AN$	$LA = IN$	$AI = LI$	$LA + AI = IN + AI$
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Given: $LA = IN$
Prove: $LI = AN$



STATEMENTS	REASONS
1. <input type="text"/>	1. Given
2. <input type="text"/>	2. Addition Property of Equality
3. $LA +$ <input type="text"/>	3. Segment Addition Postulate
4. $IN +$ <input type="text"/>	4. Segment Addition Postulate
5. <input type="text"/>	5. Substitution Property

10. The results of the proofs you completed in questions 8 and 9 are often stated as a theorem called the **Common Segment Theorem**. Fill in the blanks to complete the theorem.

Common Segment Theorem



Given the segment shown, the following statements are true:

If $AC = BD$, then _____. If $AB = CD$, then _____.