

Questions on Algebraic Proofs ws from yesterday?

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Name: _____ Hour: _____ Algebraic Proofs ws

1-3. Fill in the blanks to complete each proof.

1. Given: $8x - 5 = 2x + 1$
Prove: $x = 1$
Proof:

Statements	Reasons
a. $8x - 5 = 2x + 1$	a. _____
b. $8x - 5 - 2x = 2x + 1 - 2x$	b. _____
c. _____	c. Substitution Property
d. _____	d. Addition Property
e. $6x = 6$	e. _____
f. $\frac{6x}{6} = \frac{6}{6}$	f. _____
g. _____	g. _____

2. Given: $\frac{4x+6}{2} = 9$
Prove: $x = 3$
Proof:

Statements	Reasons
a. $\frac{4x+6}{2} = 9$	a. _____
b. $\frac{4x+6}{2} = 2(9)$	b. Mult. Prop.
c. $4x + 6 = 18$	c. _____
d. $4x + 6 - 6 = 18 - 6$	d. _____
e. $4x = 12$	e. Substitution
f. $\frac{4x}{4} = \frac{12}{4}$	f. Div. Prop.
g. _____	g. Substitution

3. Given: $4x + 8 = x + 2$
Prove: $x = -2$
Proof:

Statements	Reasons
a. $4x + 8 = x + 2$	a. Given
b. $4x + 8 = x + 2$	b. Substitution
c. $3x + 8 = 2$	c. Substitution
d. $3x = -6$	d. Subtr. Prop.
e. $\frac{3x}{3} = \frac{-6}{3}$	e. Substitution
f. $x = -2$	f. Division P.
g. _____	g. Substitution

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4-7. Give the reason for each statement in the following two-column proof.

4. Given: $3x + 6 = 7x - 2$
Prove: $x = 2$

Statements	Reasons
1. $3x + 6 = 7x - 2$	1. _____
2. $6 = 4x - 2$	2. _____
3. $8 = 4x$	3. _____
4. $2 = x$	4. _____
5. $x = 2$	5. _____

5. Given: $2 - 6x + 4 = 3x - 14 + x$
Prove: $x = 2$

Statements	Reasons
1. $2 - 6x + 4 = 3x - 14 + x$	1. Given
2. $6 - 6x = 3x - 14 + x$	2. Substitution P.
3. $6 - 6x + 14 = 3x + x - 14$	3. Substitution P.
4. $6 + 10x - 14 = 4x - 14$	4. Addition P.
5. $20 = 10x$	5. Addition P.
6. $2 = x$	6. Division
7. $x = 2$	7. Symmetric P.

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6. Given: $\frac{1}{2}x + 7y = 10 - y$
Prove: $x = 40 - 32y$

Statements	Reasons
1. $\frac{1}{2}x + 7y = 10 - y$	1. _____
2. $\frac{1}{2}x + 7y - 7y = 10 - y - 7y$	2. _____
3. $\frac{1}{2}x = 10 - 8y$	3. _____
4. $\left(\frac{1}{2}\right)\left(\frac{1}{2}\right) = 4(10 - 8y)$	4. _____
5. $x = 4(10 - 8y)$	5. _____
6. $x = 40 - 32y$	6. _____

7. Given: $5(n - 3) = 4(2n - 7) - 14$
Prove: $n = 9$

Statements	Reasons
1. $5(n - 3) = 4(2n - 7) - 14$	1. _____
2. $5n - 15 = 8n - 28 - 14$	2. _____
3. $5n - 15 = 8n - 42$	3. _____
4. $5n - 15 + 15 = 8n - 42 + 15$	4. _____
5. $5n = 8n - 27$	5. _____
6. $5n - 8n = 8n - 27 - 8n$	6. _____
7. $-3n = -27$	7. _____
8. $\frac{-3n}{-3} = \frac{-27}{-3}$	8. _____
9. $n = 9$	9. _____

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8-10. Complete each proof

8. Given: $4 - 7x = 2x - 23$
Prove: $x = 3$

Statements	Reasons

9. Given: $\frac{1}{2}x + 6y = 8 - 3y$
Prove: $x = 16 - 18y$

Statements	Reasons

10. Given: $-(n - 5) = 2(3n - 8) - 7$
Prove: $n = 4$

Statements	Reasons
1. $-(n - 5) = 2(3n - 8) - 7$	1. Given
2. $-n + 5 = 6n - 16 - 7$	2. Distributive P.
3. $-n + 5 = 6n - 23$	3. Substitution P.
4. $-n + 5 = 6n - 23$	4. Addition P.
5. $-n + 5 = 6n - 23$	5. Addition P.
6. $\frac{-n + 5}{-1} = \frac{6n - 23}{-1}$	6. Division P.
7. $n = 4$	7. Symmetric P.

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Get out Ch 6 Reasons for Proofs
Remember these from yesterday

Algebraic Properties

- 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 $ac = bc$
- Division Property of equality: if $a = b$, then $a/c = b/c$
- Distributive Property: $a(b + c) = ab + ac$

These properties need to happen on both sides of the equation

Properties used for both Equality and Congruence

- Reflexive Property: $a = a$
- Symmetric Property: if $a = b$, then $b = a$
- Transitive Property: if $a = b$ and $b = c$, then $a = c$
- Substitution Property: if $a = b$, then you can replace b with a or a with b in any expression

**Simplifying like terms (do the math)

If you are just adding or combining like terms on one side of the equation it's the substitution property

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Get out Ch 6 Reasons for Proofs
Go over today

Lines and Angles

Definition of an Angle Bisector: An angle bisector divides an angle into two equal parts.

Definition of Supplementary Angles: Two angles whose sum is 180°

Definition of a Midpoint: A midpoint divides a segment into two equal parts.

Definition of a Linear Pair: Two angles that are adjacent and supplementary

Definition of Vertical Angles: The angles opposite each other in two intersecting lines.

Definition of Complementary Angles: Two angles whose sum to 90°

Definition of a Right Angle: An angle that measures 90°

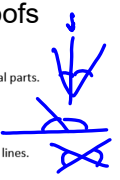
Definition of Perpendicular Lines: Two lines that intersect at a 90° angle.

Definition of Congruent: if $\angle 1 \cong \angle 2$, then $m\angle 1 = m\angle 2$; if $\overline{AB} \cong \overline{CD}$ then $AB = CD$

Postulates & Theorems

Angle Addition Postulate: The larger angle equals the sum of the measure of its parts.

Segment Addition Postulate: The larger segment equals the sum of the measure of its parts.



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Some properties of equality have corresponding properties of congruence.

Key Concept	Properties of Congruence
Reflexive Property	$\overline{AB} \cong \overline{AB}$ $\angle A \cong \angle A$
Symmetric Property	If $\overline{AB} \cong \overline{CD}$, then $\overline{CD} \cong \overline{AB}$. If $\angle A \cong \angle B$, then $\angle B \cong \angle A$.
Transitive Property	If $\overline{AB} \cong \overline{CD}$ and $\overline{CD} \cong \overline{EF}$, then $\overline{AB} \cong \overline{EF}$. If $\angle A \cong \angle B$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$. If $\angle B \cong \angle A$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$.

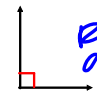
$\angle A$ vs $m\angle A$ ← measure of angle A

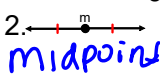
\overline{AB} vs \overline{AB} vs \overline{AB}

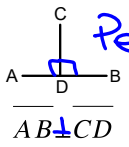
segment line length of line

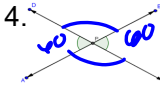
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How would you categorize the following?

1.  Right angle

2.  midpoint

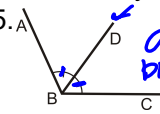
3.  Perp. Line
 $AB \perp CD$

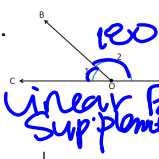
4.  vertical angles


- Angle Bisector
- Supplementary Angles
- Midpoint
- Linear Pair
- Vertical Angles
- Complementary Angles
- Right Angle
- Perpendicular Lines

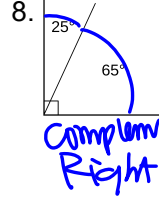
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How would you categorize the following?

5.  angle bisector

6.  180
Linear Pair
Supplementary

7.  Supplementary

8.  25°
65°
Complementary
Right angle

- Angle Bisector
- Supplementary Angles
- Midpoint
- Linear Pair
- Vertical Angles
- Complementary Angles
- Right Angle
- Perpendicular Lines

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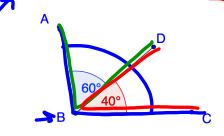
Which property justifies the following statements?

1. $\angle O \cong \angle W$ and $\angle W \cong \angle L$ $\angle O \cong \angle L$ Transitive P.

2. $\overline{AR} \cong \overline{TY}$ $\overline{TY} \cong \overline{AR}$ symmetric P.

Angle Addition Postulate
Adding the measures of 2 Adjacent Angles
Equals the measure of the Full/Total Angle

$m\angle ABC = m\angle ABD + m\angle DBC$



Segment Addition Postulate

The larger segment equals the sum of the measure of its smaller parts

$$AC + CD + DB = AB$$

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due Tuesday

Name _____ Hour _____ Properties and Postulates ws

1-5. State which property justifies the step shown.

1. $x + 7 = 9$ 2. $y - 8 = 14$ 3. $\frac{15a + 42}{195} = 14$ 4. $\frac{z}{2} = -10$ 5. $5(x + 7) = 5x + 35$
 $x = 2$ $y = 22$ $195 \cdot 14$ $x = -20$ $-5x + 35$

Division P.

6-8. State which property justifies following statements.

6. If $7x = 21$, then $21 = 7x$ 7. $32ab = 32ab$ 8. If $7x = 21$, and $21 = 3y$ then $7x = 3y$

Reflexive P. Transitive P.

9-16. Fill in each blank with the correct vocab word. No words repeat and not all are used.

Angle Addition Postulate	Vertical Angles
Complementary Angles	Angle Bisector
Symmetric Property	Midpoint
Segment Addition Postulate	Linear Pair
Supplementary Angles	Transitive Property

9. BD is the _____

10. M is the _____ of AB

11. The angles below are _____

12. The diagram shows a _____

13. The _____ Add. Post. is represented below

14. Angle a and b are _____

15. The angles below are _____

16. $AM + MB = AB$

★17. Y is the midpoint of XZ. Solve for x.

★18. The angles are complementary. Solve for x.

★19. Find the measure of a and b.

20. $m\angle GHC = 60^\circ$ and $m\angle CHJ = 104^\circ$. Find $m\angle GHJ$.

21. AB is the angle bisector. Solve for x.

22. DE = _____

23. $m\angle FCD = x + 41$, $m\angle BCF = x + 78$, and $m\angle BCD = 95^\circ$. Find x.

★24. Find the measure of angle x.

25. Solve for x. Find the measure of each angle.

★26. Solve for x.

27. Solve for x.

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