Justifying Work Part 1

You know how to solve these kinds of problems. Now, I expect you to explain <u>how you solve them</u>. Moreover, I expect you to follow the steps that I give you to solve the problem *exactly* as I tell you to solve it.

On the left side of the page, I have solved a problem from the content you have already learned. Your work is to fill in the blanks explaining **how I got to each step (never explain ahead of the step you're on).**
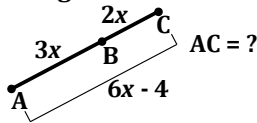
On the right side of the page, I have explained how to solve a problem from the content you have already learned. Your work is to fill in the blanks **doing the math to solve the problem, <u>the way I have described it.</u>**

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Segment and Angle Addition Problems

Remember the rule:

part1 + part2 = whole

EXAMPLE: Explaining the Math

$2x$ C
$3x$ B   AC = ?
A $6x - 4$

Each Step of Math	What I did/knew to get to that step of Math
1. $AB = 3x, BC = 2x,$ & $AC = 6x - 4$	1. **Copied the measures from the problem**
2. $AB + BC = AC$	2. **It's segment addition. part1 + part2 = whole**
3. $3x + 2x = 6x - 4$	3. **Plugged in the measures**
4. $5x = 6x - 4$	4. **Combined like terms on one side**
5. $-x = -4$	5. **Subtracted 6x from both sides**
6. $x = 4$	6. **Divided both sides by -1**
7. $AC = 6(4) - 4$	7. **Plugged in x = 4 to AC**
8. $AC = 20$	8. **Solved that side of =**

EXAMPLE: Following instructions to write the Math

D $(8x + 10)°$ F
$(2x + 4)°$
E   G
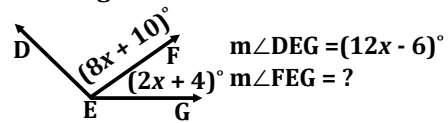
m∠DEG =(12x - 6)°
m∠FEG = ?

Each Step of Math	What I did/knew to get to that step of Math
1. $m∠DEF = (8x + 10)°,$ $m∠FEG = (2x + 4)°,$ & $m∠DEG = (12x - 6)°.$	1. Copied the measures from the problem
2. $m∠DEF + m∠FEG= m∠DEG$	2. It's angle addition. part1 + part2 = whole
3. $8x + 10 + 2x + 4 = 12x - 6$	3. Plugged in the measures
4. $10x + 14 = 12x - 6$	4. Combined like terms on one side
5. $14 = 2x - 6$	5. Subtracted 10x from both sides
6. $20 = 2x$	6. Added 6 to both sides
7. $10 = x$	7. Divided both sides by 2
8. $x = 10$	8. Switched 10 and x, so x would be on the left of =
9. $m∠FEG = 2(10) + 4$	9. Plugged in x = 10 to $m∠FEG$.
10. $m∠FEG = 24°$	10. Solved that side of =

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Midpoint and Bisector Problems

Remember the rules:

part1 ≅ part2   **2(part) = whole**

Problem #1: Explaining the Math

M

L

P   N

$\overrightarrow{MP}$ bisects ∠LMN
m∠LMP =(5x + 4)°
m∠PMN = (8x - 14)°
m∠LMP = ?

Each Step of Math	What I did/knew to get to that step of Math
1. $\overrightarrow{MP}$ bisects ∠LMN, $m∠LMP = (5x + 4)°$, & $m∠PMN = (8x − 14)°$	1. _____
2. $∠LMN ≅ ∠PMN$	2. _____
3. $m∠LMN = m∠PMN$	3. _____
4. $5x + 4 = 8x − 14$	4. _____
5. $4 = 3x − 14$	5. _____
6. $18 = 3x$	6. _____
7. $6 = x$	7. _____
8. $x = 6$	8. _____
9. $m∠PMN = 8(6) − 14$	9. _____
10. $m∠PMN = 34°$	10. _____
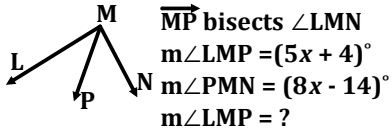
Problem #2: Following instructions to write the Math

H
$3x + 1$
J
$5x - 3$
K

J is the midpoint of HK.
HJ = ?

| Each Step of Math	What I did/knew to get to that step of Math
1. _____	1. Copied <u>all of</u> the information from the problem (midpoint and measures)
2. _____	2. Midpoint means part1 ≅ part2 (ABC order)
3. _____	3. Congruent segments are equal segments
4. _____	4. Plugged in $HJ = 3x + 1$ and $JK = 5x - 3$
5. _____	5. Subtracted $3x$ from both sides
6. _____	6. Added 3 to both sides
7. _____	7. Divided both sides by 2
8. _____	8. Switched the sides of the =, so x would be on the left
9. _____	9. Plugged x = 2 into HJ
10. _____	10. Solved that side to get HJ

Justifying Work Part 1

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<u>Vertical Angle Problems</u>

Remember the rule:

Vertical Angle 1 ≅ Vertical Angle 2

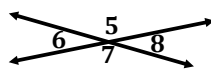## Problem #3: Explaining the Math
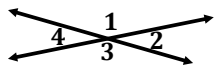
∠1 & ∠3 are vertical angles
$m\angle 1 = (4x + 16)°$ $m\angle 3 = ?$
& $m\angle 3 = (5x - 14)°$

Hint: The problem won't usually give you a picture of the angles AND tell you they're vertical. You should automatically identify it from the picture and write it in.

Each Step of Math	What I did/knew to get to that step of Math
1. ∠1 & ∠3 are vertical angles, $m\angle 1 = (4x + 16)°$ & $m\angle 3 = (5x - 14)°$	1. _____
2. $\angle 1 \cong \angle 3$	2. _____
3. $m\angle 1 = m\angle 3$	3. _____
4. $4x + 16 = 5x - 14$	4. _____
5. $16 = x - 14$	5. _____
6. $30 = x$	6. _____
7. $x = 30$	7. _____
8. $m\angle 3 = 5(30) - 14$	8. _____
9. $m\angle 3 = 136°$	9. _____

Problem #4: Following instructions to write the Math

∠6 & ∠8 are vertical angles
$m\angle 6 = (7x + 22)°$ $m\angle 6 = ?$
& $m\angle 8 = (12x + 17)°$

Hint: The problem won't usually give you a picture of the angles AND tell you they're vertical. You should automatically identify it from the picture and write it in.

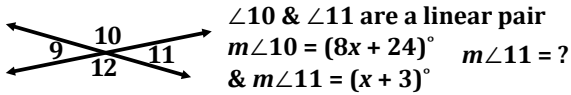| Each Step of Math	What I did/knew to get to that step of Math
1. _____	1. Copied <u>all of</u> the information from the problem (angle type and measures)
2. _____	2. Vertical angles are ≅ (numerical order)
3. _____	3. Congruent angles are equal angles
4. _____	4. Plugged in $m\angle 6$ & $m\angle 8$
5. _____	5. Subtracted $7x$ from both sides
6. _____	6. Subtracted 17 from both sides
7. _____	7. Divided both sides by 5
8. _____	8. Switched the sides of the = to get x on the left
9. _____	9. Plugged x = 1 into $m\angle 6$
10. _____	10. Solved that side to get what $m\angle 6$ equals

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<u>Linear Pair Problems</u>

Remember the rule:

Linear angle1 + Linear angle2 = 180˚

Problem #5: Explaining the Math

∠10 & ∠11 are a linear pair
$m\angle 10 = (8x + 24)°$ $m\angle 11 = ?$
& $m\angle 11 = (x + 3)°$

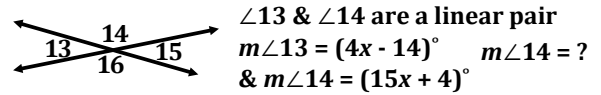*Hint: The problem won't usually give you a picture of the angles AND tell you they're linear. You should automatically identify it from the picture and write it in.*

Each Step of Math	What I did/knew to get to that step of Math
1. ∠10 & ∠11 are a linear pair, $m\angle 10 = (8x + 24)°$ & $m\angle 11 = (x + 3)°$	1. _____
2. $m\angle 10 + m\angle 11 = 180$	2. _____
3. $8x + 24 + x + 3 = 180$	3. _____
4. $9x + 27 = 180$	4. _____
5. $9x = 153$	5. _____
6. $x = 17$	6. _____
7. $m\angle 11 = 17 + 3$	7. _____
8. $m\angle 11 = 20°$	8. _____

Problem #6: Following instructions to write the Math

∠13 & ∠14 are a linear pair
$m\angle 13 = (4x - 14)°$ $m\angle 14 = ?$
& $m\angle 14 = (15x + 4)°$

Hint: The problem won't usually give you a picture of the angles AND tell you they're linear. You should automatically identify it from the picture and write it in.

Each Step of Math	What I did/knew to get to that step of Math
1. _____	1. Copied <u>all of</u> the information from the problem (angle type and measures)
2. _____	2. Linear pairs add to = 180, so I added the $m\angle$'s.
3. _____	3. Plugged in $m\angle 13$ & $m\angle 14$
4. _____	4. Combined like terms
5. _____	5. Added 10 to both sides
6. _____	6. Divided both sides by 19
7. _____	7. Plugged $x = 10$ into $m\angle 14$
8. _____	8. Solved that side to get what $m\angle 14$ equals