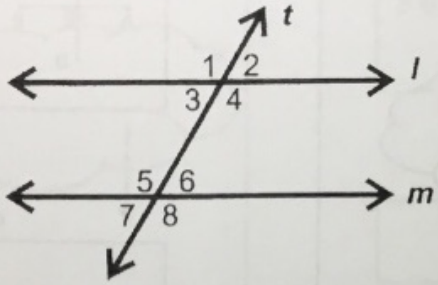
Unit 5

Lesson 2

Parallel Lines and Angle Relationships

Unit 5 – Triangles & Similarity Date________________ Pd______

Lesson 2 → Parallel Lines and Angle Relationships



$l \parallel m$ *and t is a transversal*

There are names for the special angle pairs in the diagram above.

- Angles on the same side of the transversal where one is on the outside of the parallel lines and the other non-adjacent angle is between the parallel lines are called: ***corresponding angles***.
  - ✓ Corresponding angles are ***congruent***.
  - ✓ Name the pairs of corresponding angles: 1&5, 2&6, 3&7, 4&8
- Angles on the opposite side of the transversal that are between the parallel lines that are not adjacent to each other are called: ***alternate interior angles***.
  - ✓ Alternate Interior angles are ***congruent***.
  - ✓ Name the pairs of alternate interior angles: 3&6, 4&5
- Angles on the opposite side of the transversal that are not between the parallel lines are called: ***alternate exterior angles***.
  - ✓ Alternate Exterior angles are ***congruent***.
  - ✓ Name the pairs of alternate exterior angles: 1&8, 7&2
- Opposite angles made by two intersecting lines are called: ***vertical angles***.
  - ✓ Vertical angles are ***congruent***.
  - ✓ Name the pairs of vertical angles: 1&4, 2&3, 5&8, 6&7

- Angles on the same side of the transversal that are between the parallel lines are called: ***consecutive or same – side interior angles***.
    - ✓ Consecutive Interior angles are ***supplementary***.
    - ✓ Name the pairs of consecutive interior angles: 3&5, 4&6
- Angles that are adjacent and form a line are called a ***linear pair***.
    - ✓ Linear Pair angles are ***supplementary***.
    - ✓ Name the linear pairs: 1&2, 5&6, 3&4, 2&4, 6&8, 8&7, 3&1, 7&5

➢ The **converse** of a theorem is formed by interchanging what is given with what you are trying prove.

If A then B

Ex#1:

Theorem: If ΔABC is a right triangle with $\angle C$ as the right angle, then $a^2 + b^2 = c^2$

Converse: If $a^2 + b^2 = c^2$, then ΔABC is a right triangle with $\angle C$ as the right angle.

If B then A

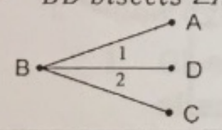
Ex#2:

Theorem: If 2 parallel lines are cut by a transversal, then alternate interior angles are congruent.

Converse: If alternate interior angles are congruent, then the two lines cut by the transversal are par

Complete the following responses and permissions.

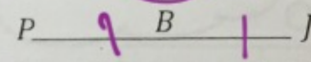
$\overrightarrow{BD}$ bisects $\angle ABC$



By Def of $\angle$ bisector

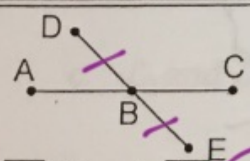
$\angle 1 \cong \angle 2$

B is the midpoint of $\overline{PJ}$



By Def of midpoint

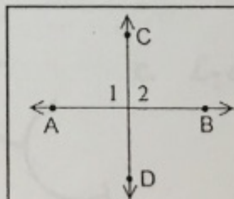
$\overline{PB} \cong \overline{JB}$



$\overline{AC}$ bisects $\overline{DE}$

By Def of segment bisector

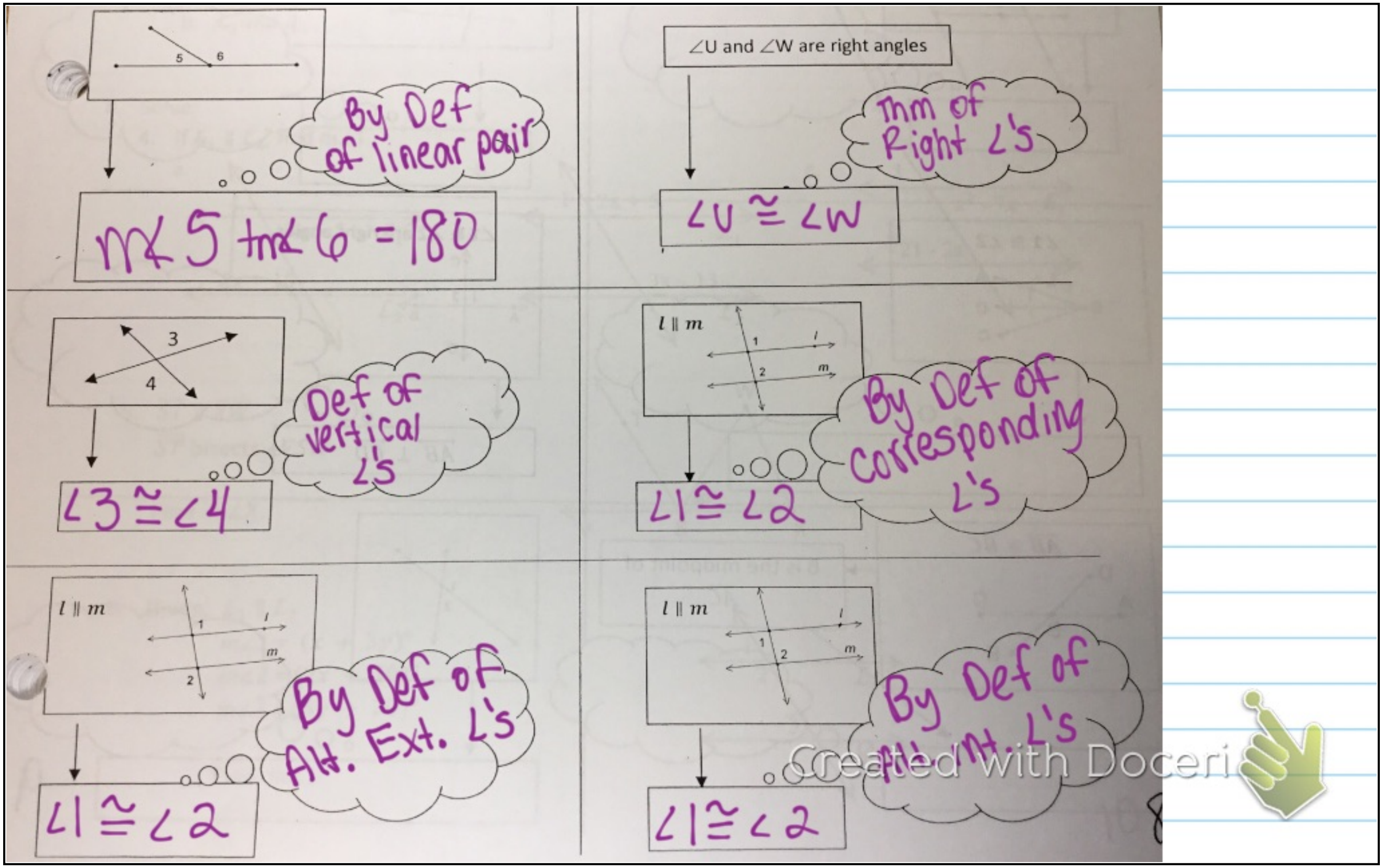
$\overline{DB} \cong \overline{EB}$



$\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$

By def of Perp lines

$\angle 1$ and $\angle 2$ are right


5
6
By Def of linear pair
m∠5 + m∠6 = 180
∠U and ∠W are right angles
Thm of Right ∠'s
∠U ≅ ∠W
3
4
Def of vertical ∠'s
∠3 ≅ ∠4
l ∥ m
1
2
l
m
By Def of Corresponding ∠'s
∠1 ≅ ∠2
l ∥ m
1
2
l
m
By Def of Alt. Ext. ∠'s
∠1 ≅ ∠2
l ∥ m
1
2
l
m
By Def of
∠1 ≅ ∠2
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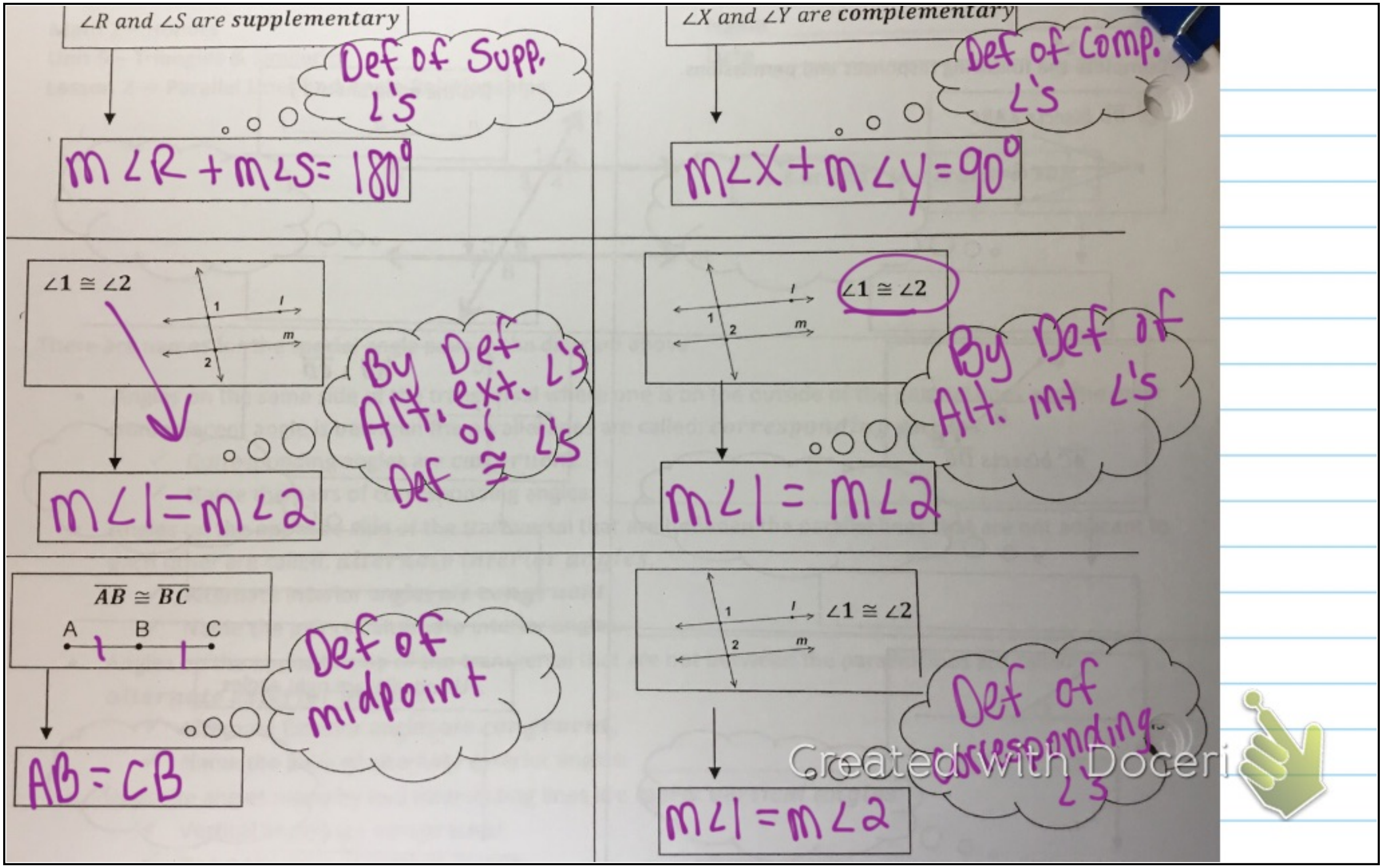


$\angle R$ and $\angle S$ are supplementary

Def of Supp. ∠'s

$m\angle R + m\angle S = 180°$

$\angle X$ and $\angle Y$ are complementary

Def of Comp. ∠'s

$m\angle X + m\angle Y = 90°$

$\angle 1 \cong \angle 2$

By Def Alt. ext. ∠'s or Def ≅ ∠'s

$m\angle 1 = m\angle 2$

$\angle 1 \cong \angle 2$

By Def of Alt. int ∠'s

$m\angle 1 = m\angle 2$

$\overline{AB} \cong \overline{BC}$

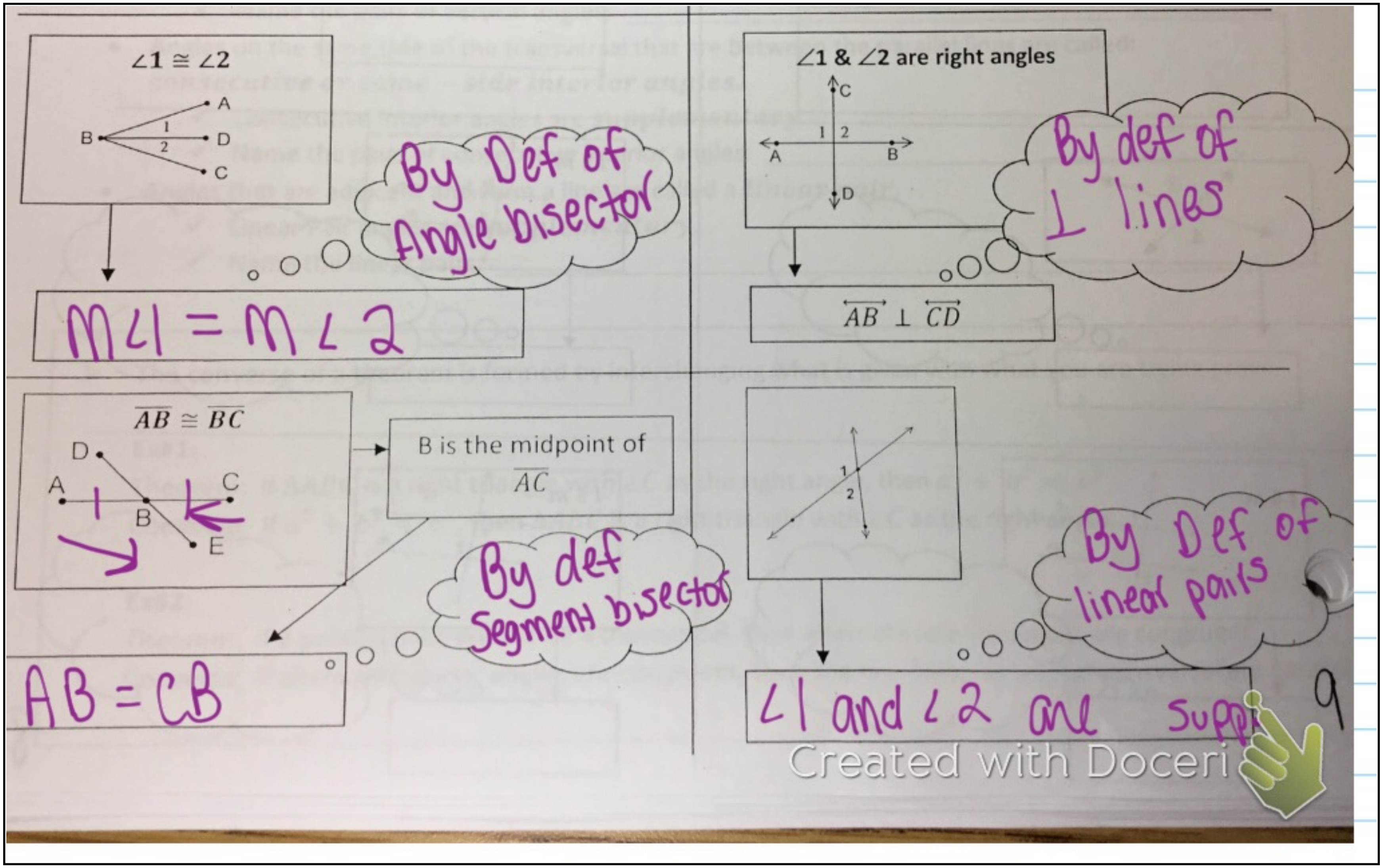
Def of midpoint

$AB = CB$

$\angle 1 \cong \angle 2$

Def of corresponding ∠'s

$m\angle 1 = m\angle 2$


$\angle 1 \cong \angle 2$
By Def of Angle Bisector
$m\angle 1 = m\angle 2$
$\angle 1$ & $\angle 2$ are right angles
By def of $\perp$ lines
$\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$
$\overline{AB} \cong \overline{BC}$
B is the midpoint of $\overline{AC}$
By def Segment bisector
$AB = CB$
By Def of linear pairs
$\angle 1$ and $\angle 2$ are suppl
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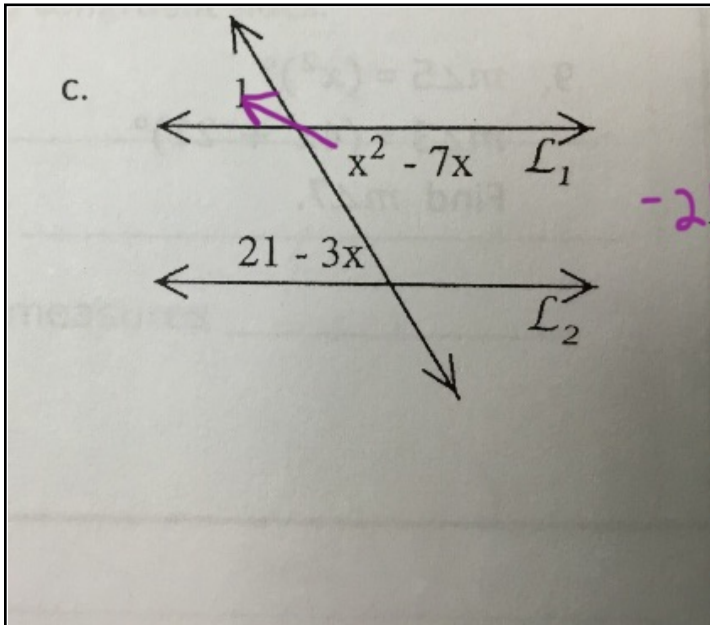


$x^2 - 7x = 21 - 3x$

$-21 \quad +3x \quad -21 \quad +3x$

$x^2 - 4x - 21 = 0$

$(x-7)(x+3) = 0$

$\cancel{x=7}$ $\quad x = -3$

$(-3)^2 - 7(-3)$

$\boxed{9 + 21 = 30^\circ}$

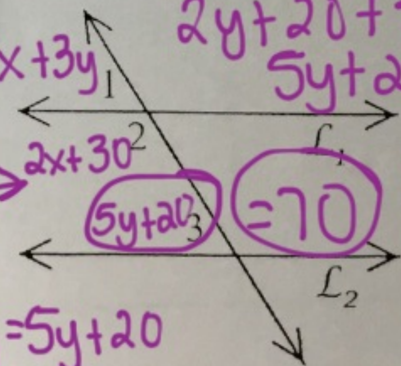
iven: $\mathcal{L}_1 \parallel \mathcal{L}_2$

$m\angle 1 = (x + 3y)^\circ$

$m\angle 2 = (2x + 30)^\circ$

$m\angle 3 = (5y + 20)^\circ$

Find $m\angle 1$. 70°



$2y+20+3y$

$5y+20$

$=70$

$x+3y=5y+20$

$-3y \quad -3y$

$x=2y+20$

$2(2y+20)+30+5y+20=180$

$4y+40+30+5y+20=180$

$9y+90=180$

$-90 \quad -90$

$9y=90$

$y=10$