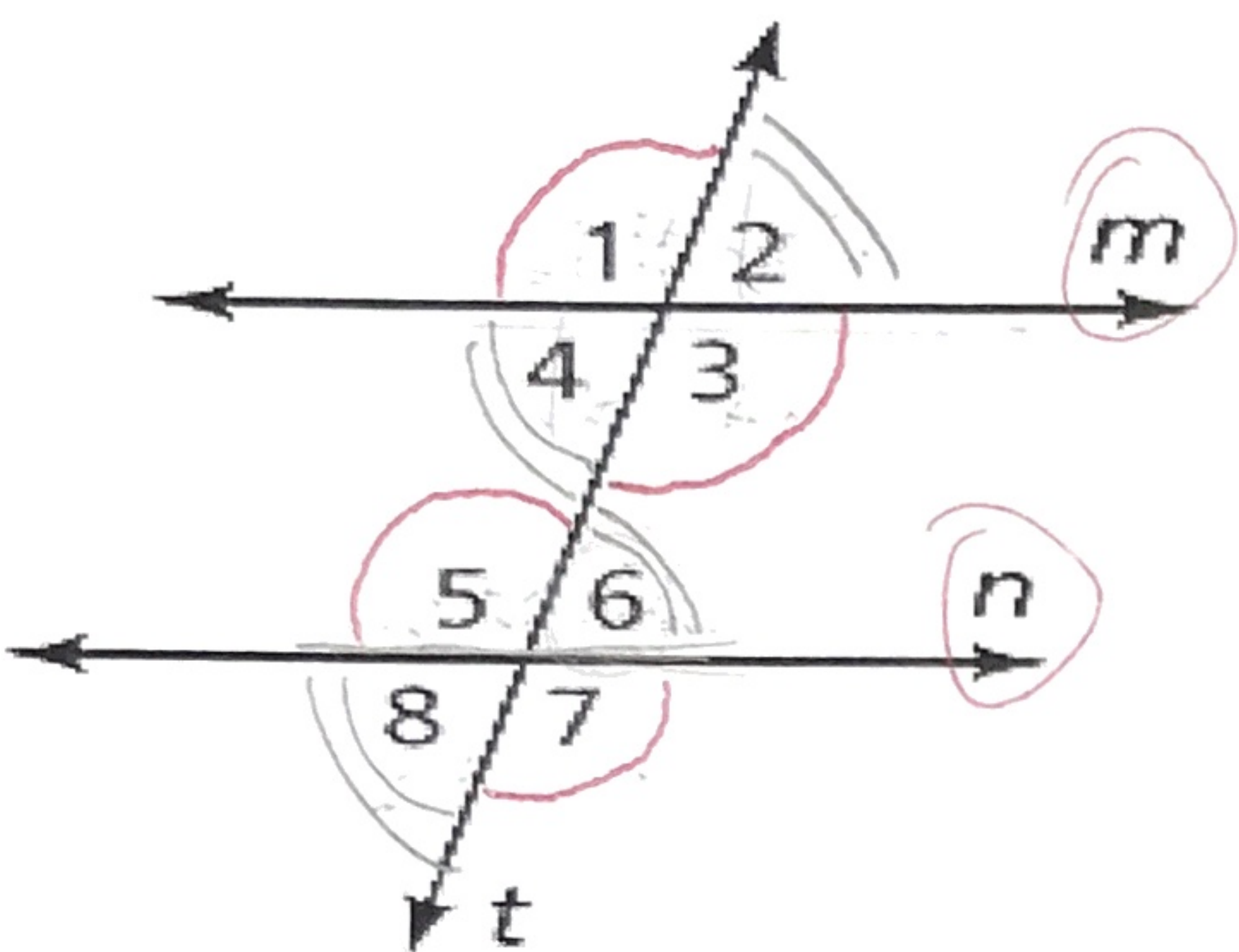Name: _____ Date: **March 2** Hour: **5th**

Unit 6B: Day 14 and 15: Angles and Parallel Lines

Focus Question: How are angles related when there are parallel lines?

A. Vocabulary Review

If a transversal cuts two parallel lines, many pairs of angles formed are congruent. — *Same direction never cross*

1. Which two lines are parallel? (mark this on the picture)
   line m is parallel to line n — **m || n**

2. Which line is the transversal? What does transversal mean? *line t* — *to cross over another line*

3. Angles 1 and 3 are __Congruent__ because... *they are vertical. (across from each other)*

4. What transformation "moves" angle 5 exactly onto angle 1? *translation*

5. List ALL angles congruent to angle 1. Explain why each is congruent.
   ∠3 b/c they are vertical
   ∠5 b/c its a translation
   ∠7   ∠7 ≅ ∠3 which is vertical (translation) to ∠1

6. What other angles are congruent to angle 2? Why?
   ∠2 ≅ ∠ __6__ ≅ ∠ __8__ ≅ ∠ __4__
   b/c its a translation   ∠8 ≅ ∠6 (vert)   its vertical
   & ∠6 ≅ ∠2

7. Supplementary angles are angles that add up to __180°__. We already know that linear pairs are supplementary. List two linear pairs.
   ∠1 & ∠2   ∠4 & ∠3   ∠8 & ∠7

8. ∠1 and ∠4 are a linear pair so they are supplementary. ∠1 and ∠2 are a linear pair so they are supplementary. Are there any other angles supplementary to ∠1? Explain.
   ∠8 b/c 8 & 5 are linear and ∠5 ≅ ∠1
   ∠6 b/c 6 & 5 are linear and ∠5 ≅ ∠1

9. List all angles that are supplementary to angle 6.
   ∠5 b/c its linear
   ∠7 b/c its linear
   ∠3 b/c ∠6 ≅ ∠2 and ∠2 is linear with ∠3
   ∠1 b/c ∠6 ≅ 2 and ∠2 is linear to ∠1

B. Finding missing angle measures.
   In the diagram at the right line s and line t are parallel.
   Find the measures of the following angles.

   Give a reason for your answer!
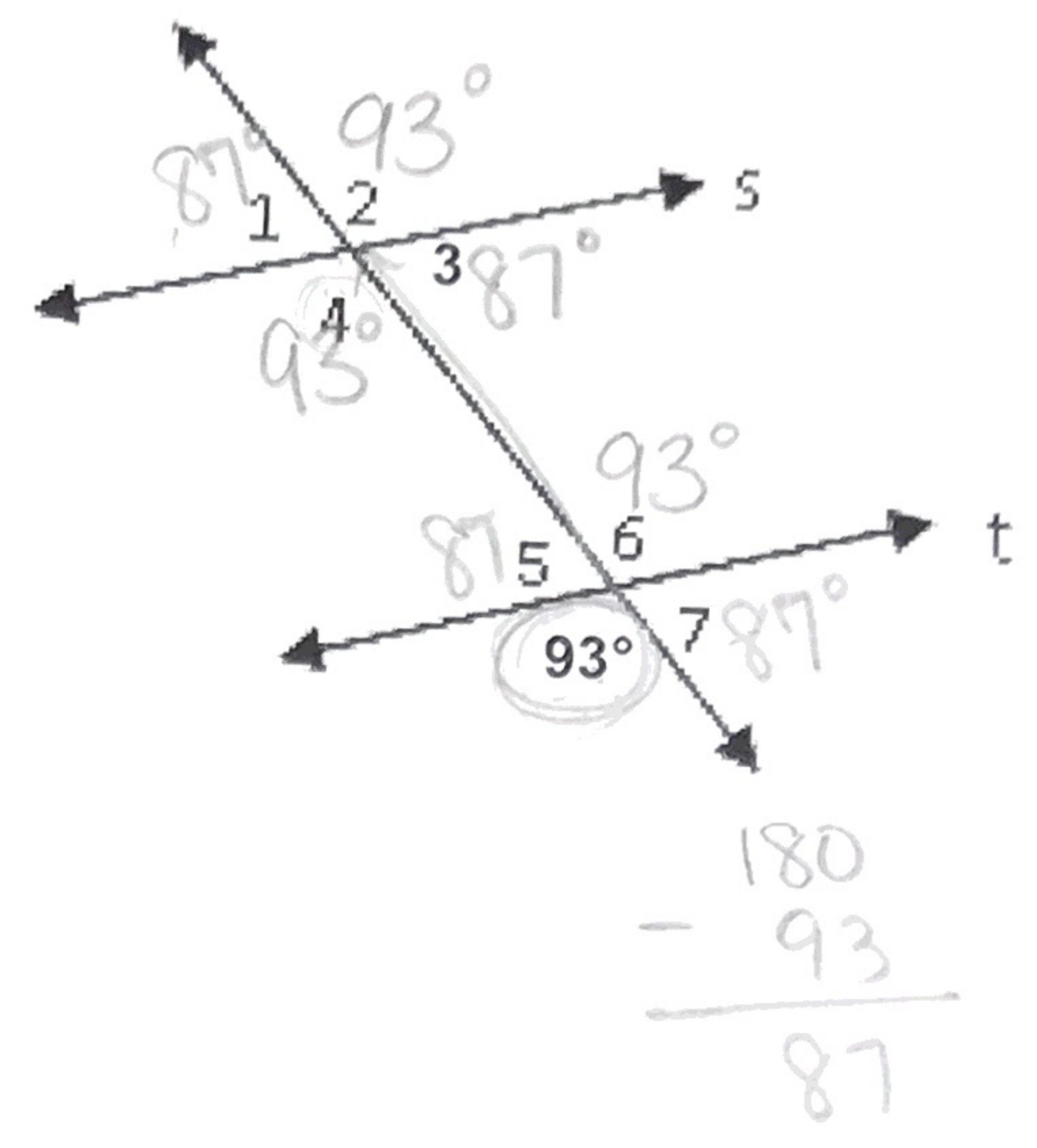
   $m\angle 1 = \underline{87°}$
   b/c its linear
   to $\angle 4$

   $m\angle 2 = \underline{93°}$
   b/c its vertical
   to $\angle 4$

   $m\angle 3 = \underline{87°}$
   b/c vertical
   to $\angle 1$

   $m\angle 4 = \underline{93°}$
   b/c its a
   translation

   $m\angle 5 = \underline{87°}$
   b/c its
   vertical
   to $\angle 7$

   $m\angle 6 = \underline{93°}$
   b/c its
   vertical

   $m\angle 7 = \underline{87°}$
   b/c its
   linear

   87° 93°
   1 2   s
   3 87°
   4°
   93°

   93°
   87 5 6   t
   93° 7 87°

   180
   − 93
   ───
   87

   Transl.
   124° t   Linear
   1 2 56°   to
                ∠1
   Vertical 3 4
   ∠2 56° 124° Trans. of
                ∠8
   124° 6 56° vert.
              to ∠7
   Linear 56° 7 8
          124°
          vert.

   → a

   → m

   i   k

   A B   E F
   i 42° C   H G
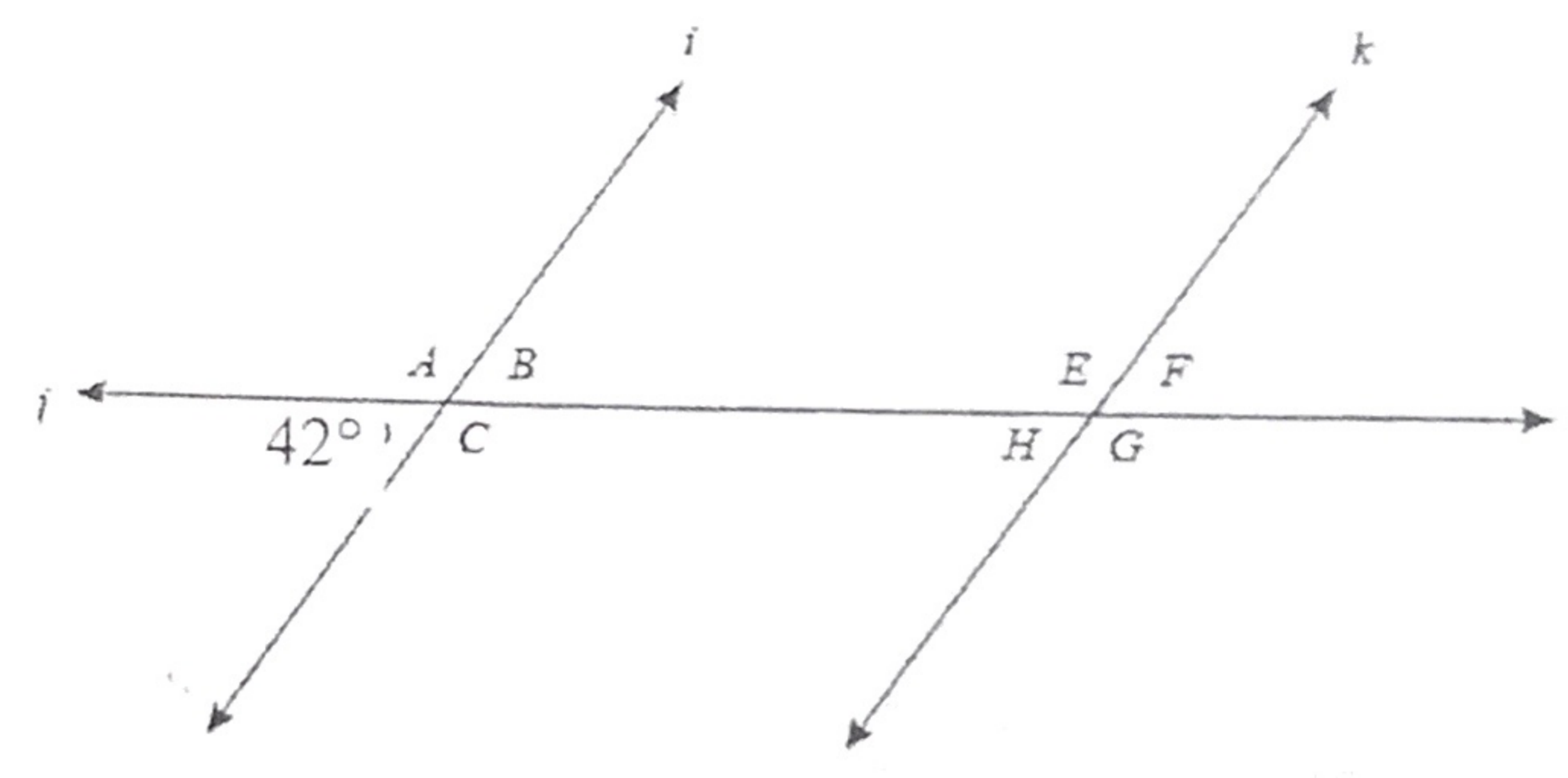
C. Decide if the given angles are congruent or supplementary. Then find the value of the variable.

1.

   m ‖ n
               30°   m
       (2x)°
       30°   n
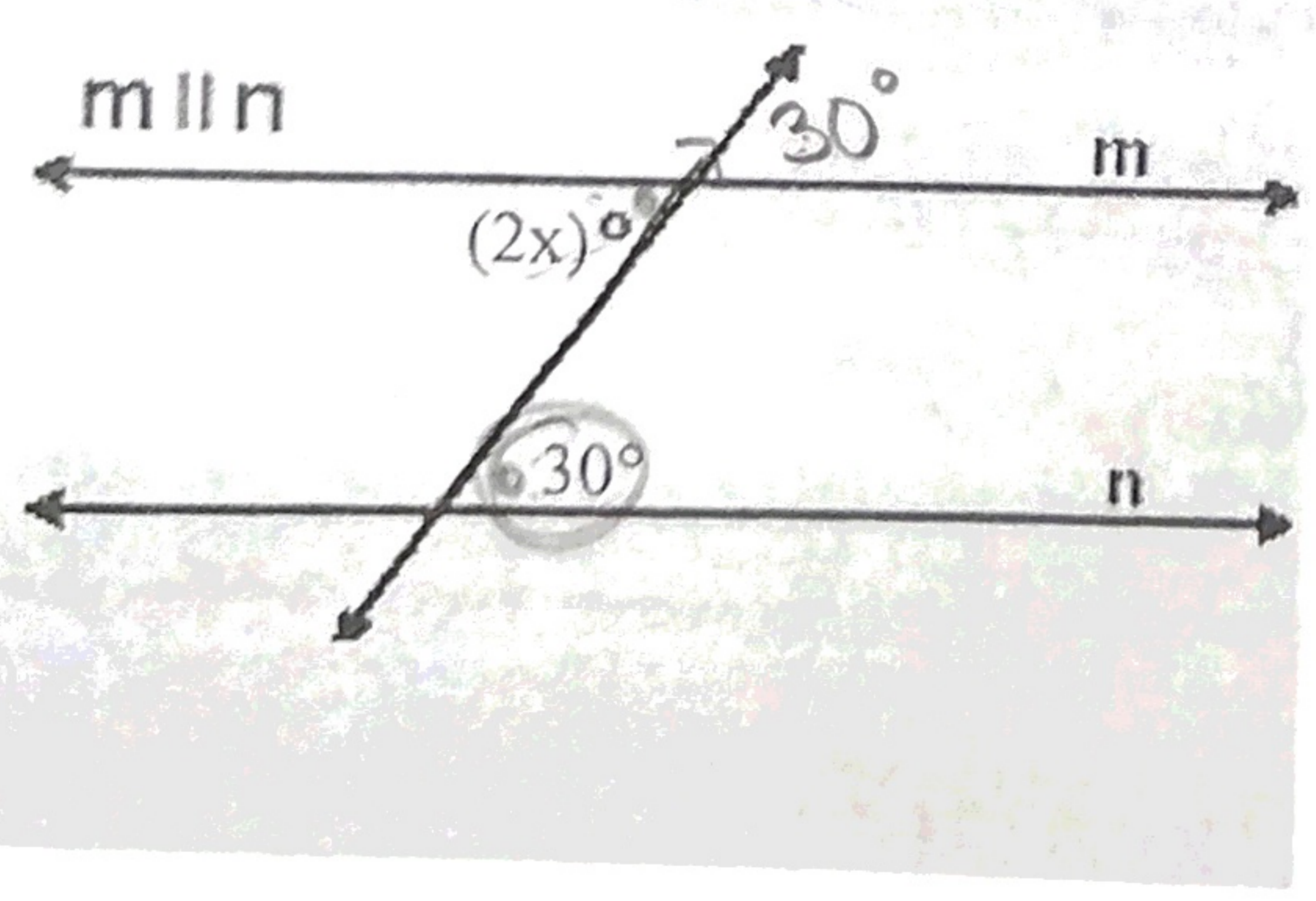
   Translate 30° up
   now the ∠'s are vertical
   so they are ≅.

   $\dfrac{2x}{2} = \dfrac{30}{2}$

   $\boxed{X = 15}$

2.

$145°$

$(x - 25)°$ — m

$145°$

t
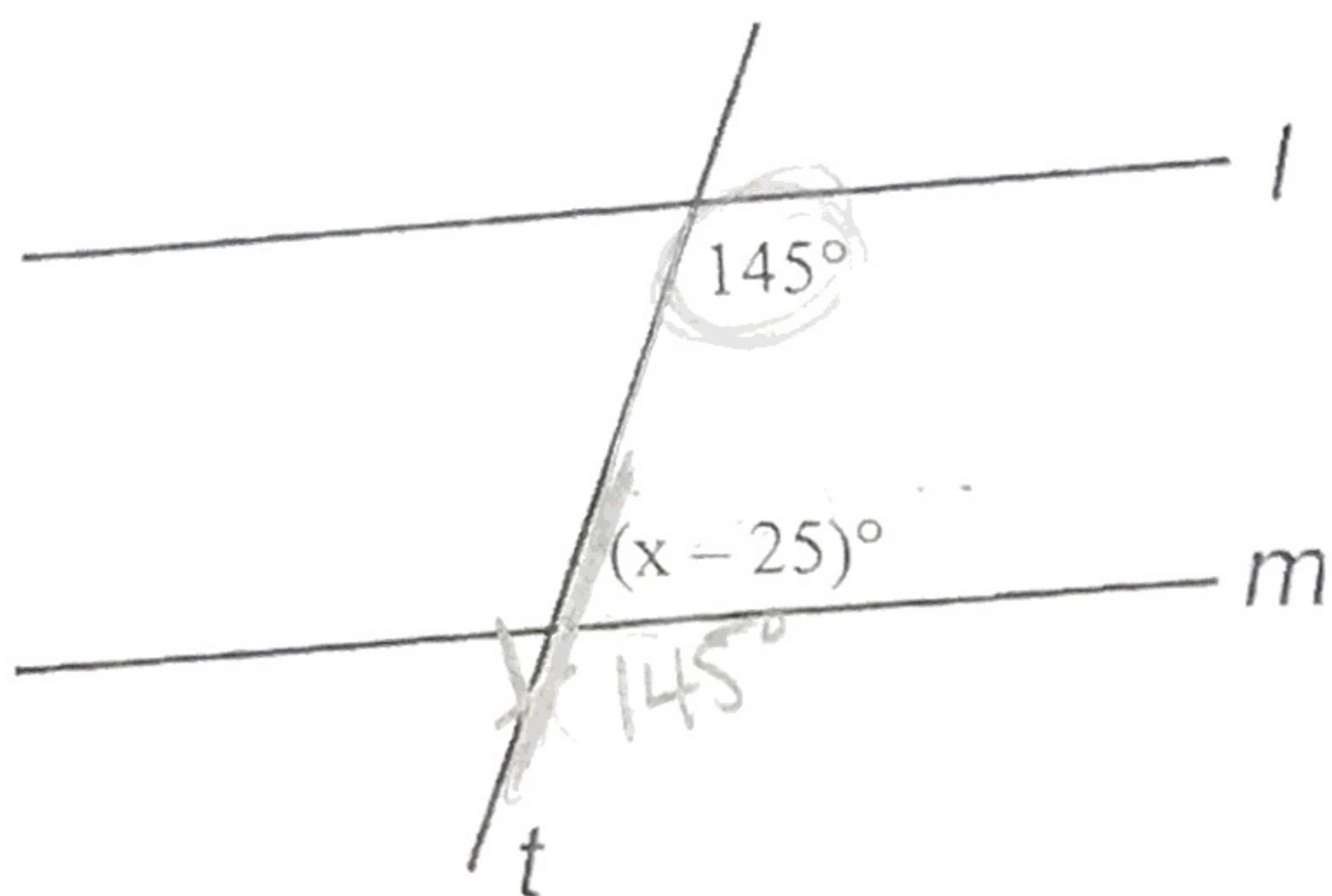
Translate 145° down now the ∠'s are linear so they are supplementary

$145 + x - 25 = 180$

$120 + x = 180$

$-120 \qquad -120$

$x = 60$

3.

$45°$ — l

$45°$ — m
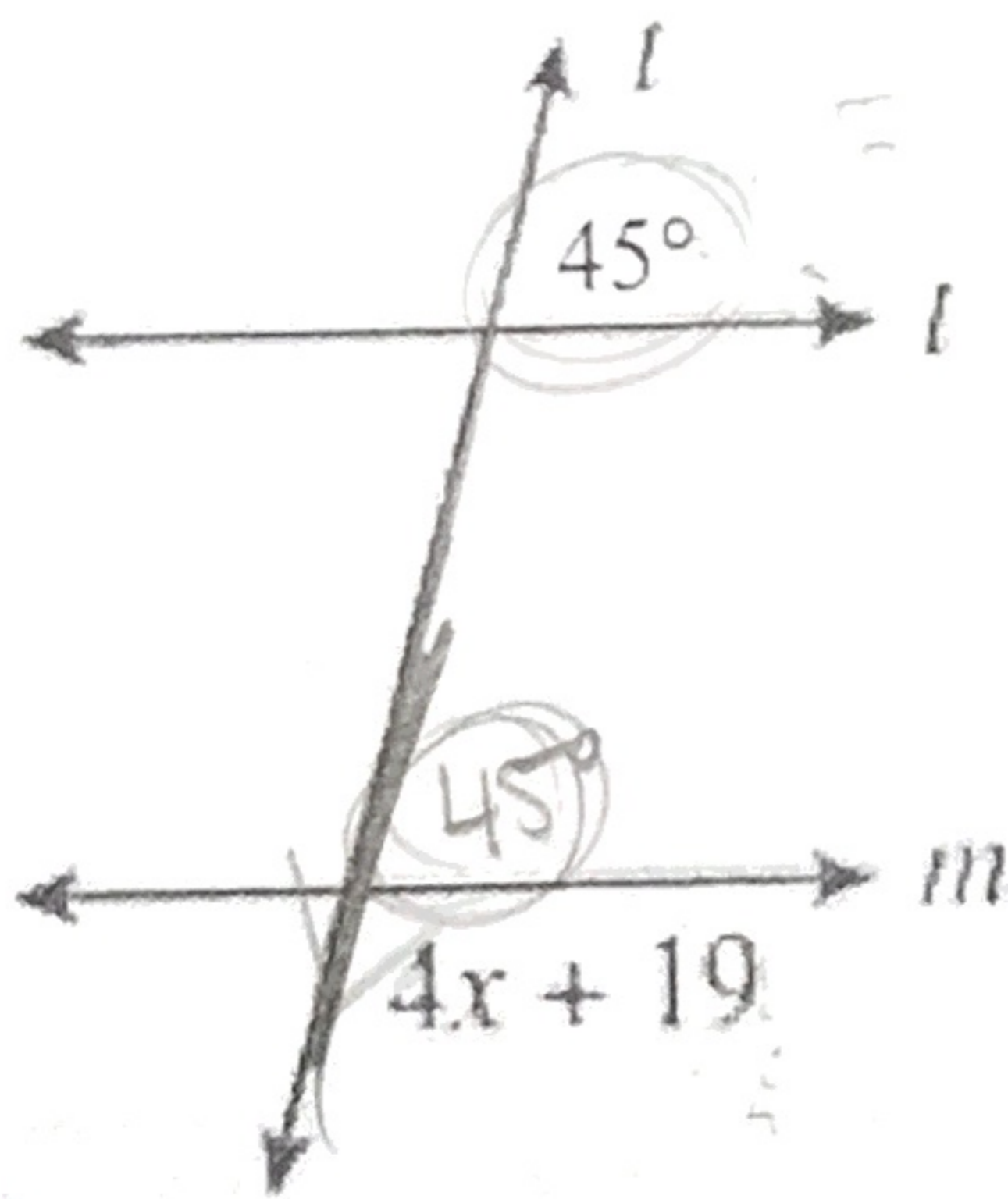
$4x + 19$

Translate 45° down, now they are linear so they are supplementary.

$45 + 4x + 19 = 180$

$64 + 4x = 180$

$-64 \qquad -64$

$\dfrac{4x}{4} = \dfrac{116}{4}$

$x = 29$

D. Practice with the provided worksheet

pick 2

Angles in Parallel Lines Practice

Name: _____

For each picture, tell whether the angles are congruent or supplementary. Then, EXPLAIN how you know you are correct. Finally, give the value of the variable.

Picture	Congruent or Supplementary	Explanation	Value of Variable Work
$91°$ ... 91	Suppl.	b/c... translate 91° & they are linear	$x + 91 = 180$ $-91 \quad -91$ $\boxed{x = 89°}$
$(3x+4)°$ ... 98 ... $98°$	Suppl.	b/c... translate 98° & they are linear	$3x + 4 + 98 = 180$ $3x + 102 = 180$ $-102 \quad -102$ $\frac{3x}{3} = \frac{78}{3}$ $\boxed{x=26}$
$54°$ ... $(2x+4)°$ ... $54°$	$\cong$	b/c... translate 54° & they are vertical	$2x + 4 = 54$ $-4 \quad -4$ $\frac{2x}{2} = \frac{50}{2}$ $\boxed{x=25}$
h — $(4x+10)°$ k — $(6x-40)°$	$\cong$	b/c... transl. 4x+10 down & they are vert.	$4x + 10 = 6x - 40$ $-4x \qquad -4x$ $10 = 2x - 40$ $+40 \qquad +40$ $\frac{50}{2} = \frac{2x}{2}$ $\boxed{x=25}$
a — $x+20$ / $(4x-10)°$ b — $(x+20)°$	Suppl.	b/c... transl. x+20 up & they are linear	$x + 20 + 4x - 10 = 180$ $5x + 10 = 180$ $-10 \quad -10$ $\frac{5x}{5} = \frac{170}{5}$ $\boxed{x = 34}$