In our final lesson of the year (yikes), we will look at the properties of two parallel lines intersected by a third line. There are three theorems, or patterns, that exist within two parallel lines. Keep in mind the theorems of SAT and OAT in this lesson.
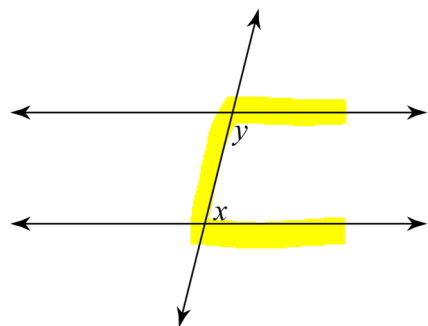
1. Alternate Angles

"Z" pattern

$$x + 180 - y = 180 \quad \text{"C" pattern}$$
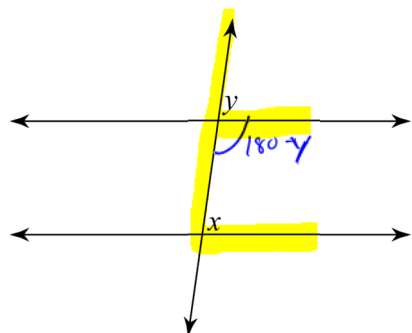
$$x - y = 0$$

$$x = y$$
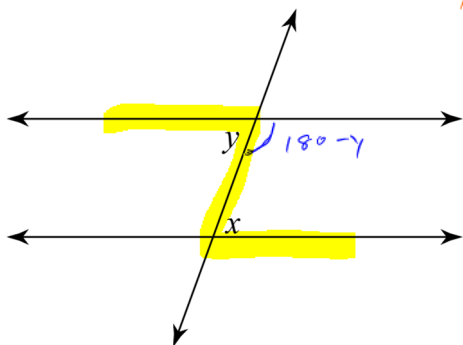
2. Co-interior Angles
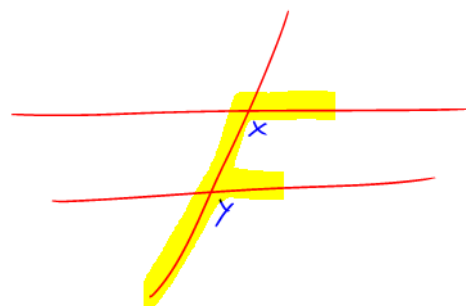

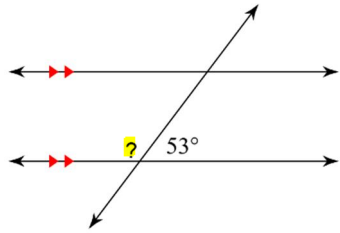$$x + y = 180°$$

"C" pattern

3. Corresponding Angles
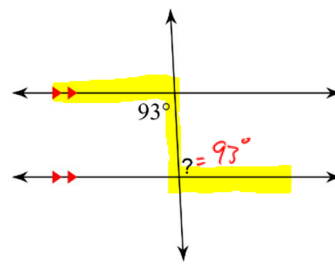

By the same logic as #1, $x = y$.

"F" pattern.

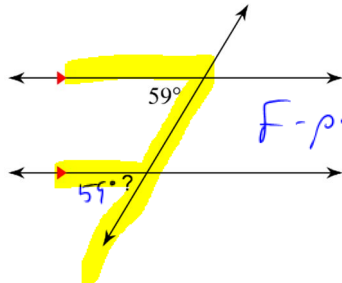**Example 1:** Find the measure of the indicated angle (?). State your reasoning.
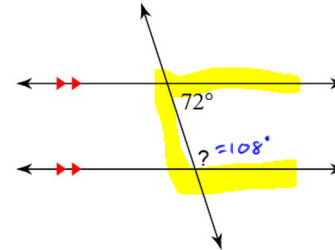
a)

$180 - 53$
$127°$ SAT

b)

93°

2 -pattern

?= 93°

c)

59°

F-pattern

59°·?

d)

72°

C-pattern

? =108°

Example 2: Determine the value of *x*. State your reasonings.

a)

66°

7x + 10

$7x + 10 = 66$ → 2 pattern

$\frac{7x}{7} = \frac{56}{7}$

$x = 8$

b)

x + 90
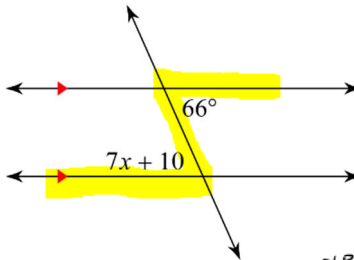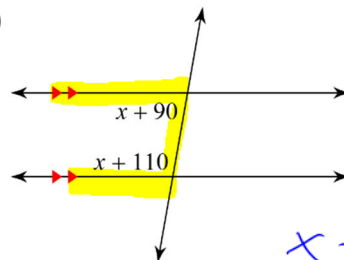
x + 110

C-pattern

$x + 90 \leftarrow x + 110 = 180$

$2x + 200 = 180$

$\frac{2x}{2} = \frac{-20}{2}$

$x = -10$

c)

x + 60

55°
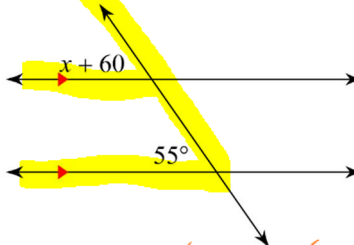
$x + 60 = 55$ F pattern.

$x = -5$

d)

10x

11x − 5

$11x - 5 = 10x$ OAT

$11x - 10x = 5$

$x = 5$