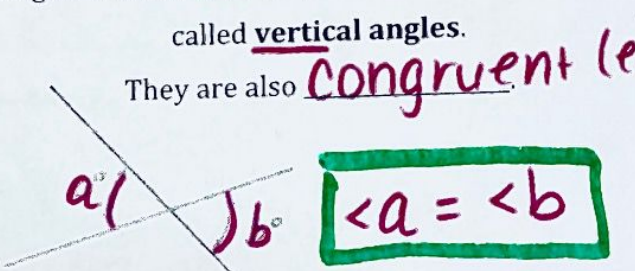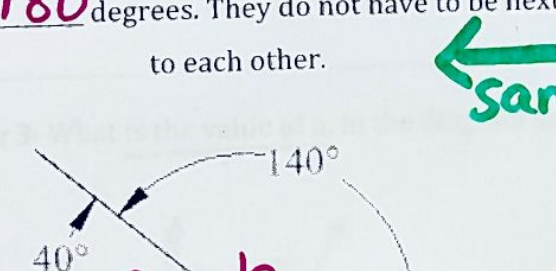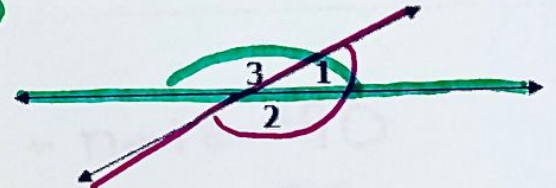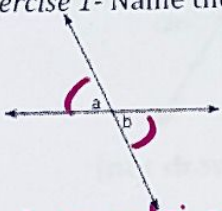## 8-4 Complementary, Supplementary and Vertical Angles
"I can determine the measure of an angle using angle relationships."

**Warm Up: Answer the following questions based off your knowledge from 7th grade math.**

- Define **complementary angles**: angles that add to 90°. Form a right angle.

- Define **supplementary angles**: angles that add to 180°. Form a straight line.

Complementary Angles	Vertical Angles
Two angles are **complementary angles** if they add up to **90** degrees. They do not have to be next to each other. $<a + <b = 90$ 40° a 50° b 55° 35° $50 + 40 = 90$	When two lines intersect, four angles are created. Angles that are **across** from each other are called **vertical angles**. They are also **congruent (equal!)**. a b $<a = <b$
Supplementary Angles	Linear Pairs
Two angles are **supplementary angles** if they add up to **180** degrees. They do not have to be next to each other. same 140° 40° a b $<a + <b = 180$	Adjacent supplementary angles are called **linear** pairs because they form a **line**. 3 1 2 $m<1 + m<2 = 180$ $m<1 + m<3 = 180$

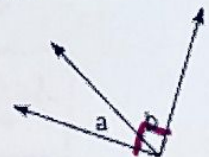*Exercise 1-* Name the relationship: complementary, supplementary, vertical, or adjacent

(a) vertical
$<a = <b$
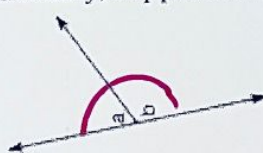
(b) Supplementary
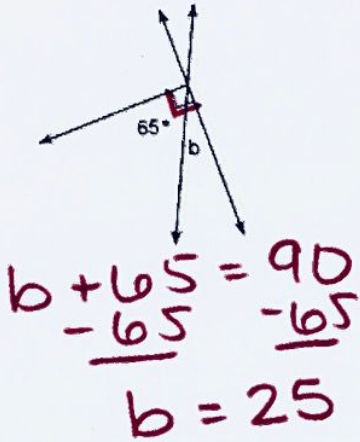$<a + <b = 180$
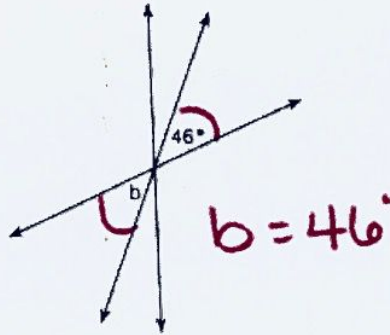
(c) Complementary
$<a + <b = 90$

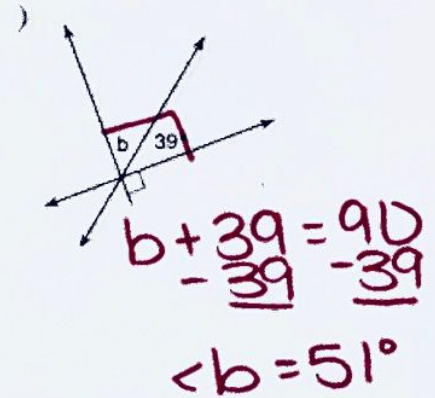*Exercise 2*- given the diagram below; determine the missing value for the angles
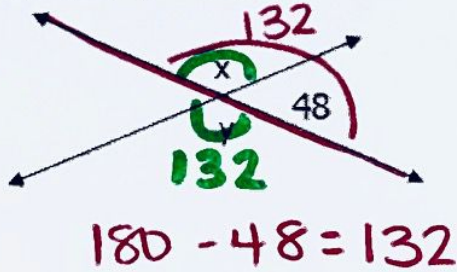
(a) $\angle b = 25°$

(b) $\angle b = 46°$

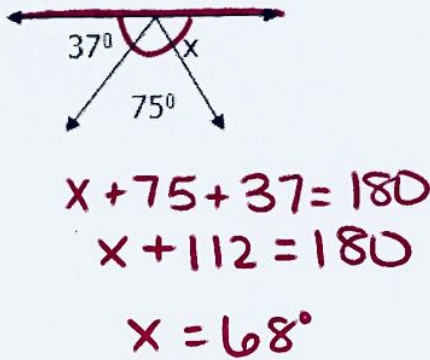(c) $\angle b = 51°$

$b + 65 = 90$
$-65 \quad -65$
$b = 25$

$b = 46°$

$b + 39 = 90$
$-39 \quad -39$
$\angle b = 51°$

(d) $132°$

(e) $68°$

(f) $38°$

$180 - 48 = 132$

$x + 75 + 37 = 180$
$x + 112 = 180$
$x = 68°$

$x + 52 = 90$
$-52 \quad -52$
$x = 38°$
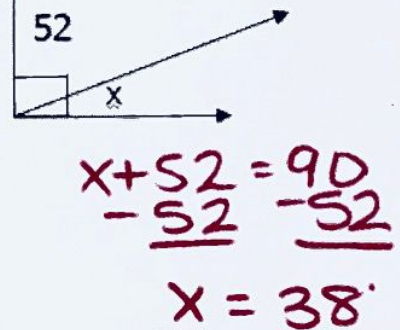
Exercise 3- What is the value of n, in the diagram below?

$(n + 18)°$

$2n°$

$(2n)°$

[not drawn to scale]
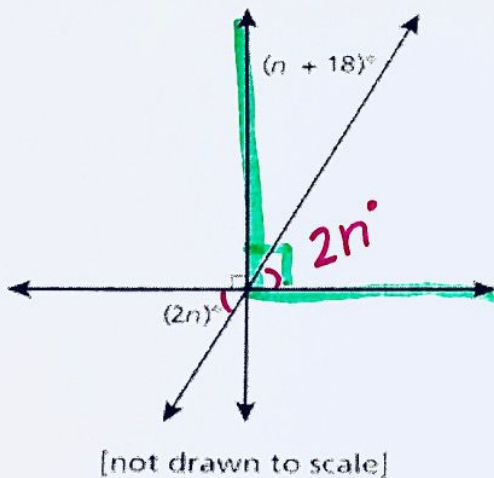
$2n + n + 18 = 90$
$3n + 18 = 90$
$-18 \quad -18$
$\dfrac{3n}{3} = \dfrac{72}{3}$
$\boxed{n = 24}$