

Grade 8 Math Geometry **Finding the Value of a Variable in Intersecting Line Patterns**

Name: Key Class: _____ Date: _____

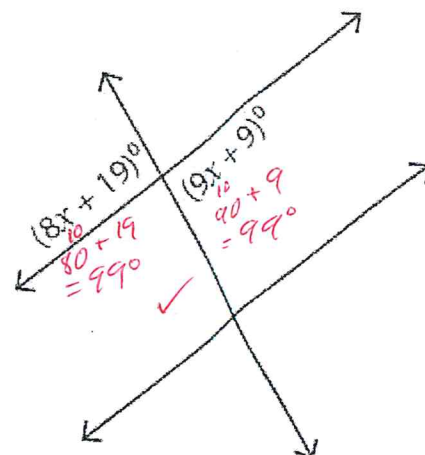
For each of the diagrams, Identify the Pattern of the angles and indicate if the pattern is congruent or supplementary. Then solve for x.

1. Pattern?

Opposite Angles

Congruent ✓ Supplementary _____

Solve for x -> Equation:
$$\begin{aligned} (8x + 19)^\circ &= (9x + 9)^\circ \\ -8x & \quad -9x \\ 19 &= x + 9 \\ 10 &= x \end{aligned}$$

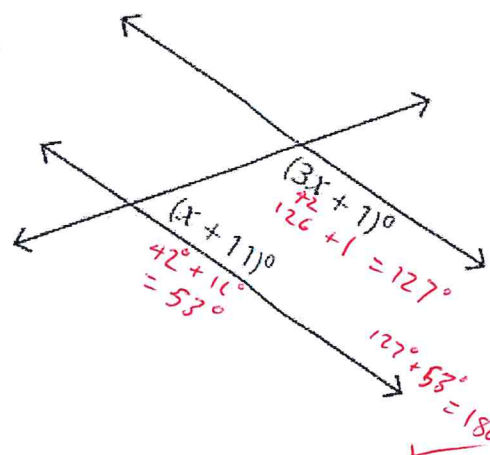


2. Pattern?

Consecutive Interior or Same Side Interior

Congruent _____ Supplementary ✓

Solve for x -> Equation:
$$\begin{aligned} (3x + 1)^\circ + (x + 11)^\circ &= 180^\circ \\ 4x + 12^\circ &= 180^\circ \\ 4x &= 168^\circ \\ x &= 42^\circ \end{aligned}$$



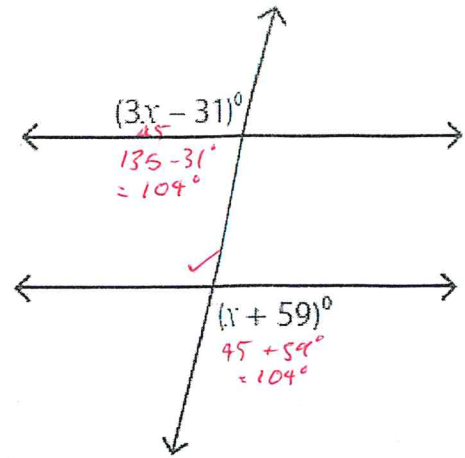
3. Pattern?

Alternating Exterior Angles

Congruent ☒ Supplementary ☐

Solve for x -> Equation: $(3x - 31)^\circ = (x + 59)^\circ$

$$\begin{aligned} 3x - 31 &= x + 59 \\ 3x - 31 &+ 31^\circ = x + 59 + 31^\circ \\ 2x - 31 &= 90 \\ 2x &= 90 + 31 \\ 2x &= 121 \\ x &= 60.5 \end{aligned}$$



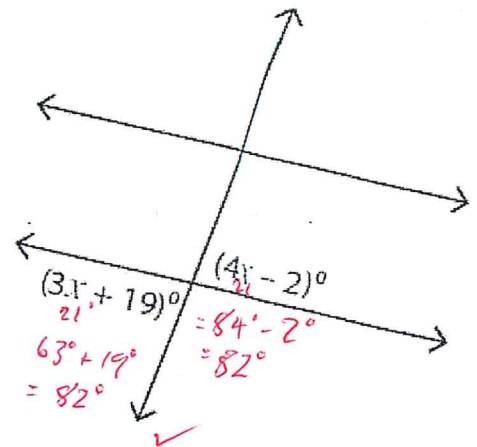
4. Pattern?

Opposite Angles

Congruent ☒ Supplementary ☐

Solve for x -> Equation: $(3x + 19)^\circ = (4x - 2)^\circ$

$$\begin{aligned} 3x + 19 &= 4x - 2 \\ 3x + 19 &- 3x = 4x - 2 - 3x \\ 19 &= x - 2 \\ 19 &+ 2 = x - 2 + 2 \\ 21 &= x \end{aligned}$$



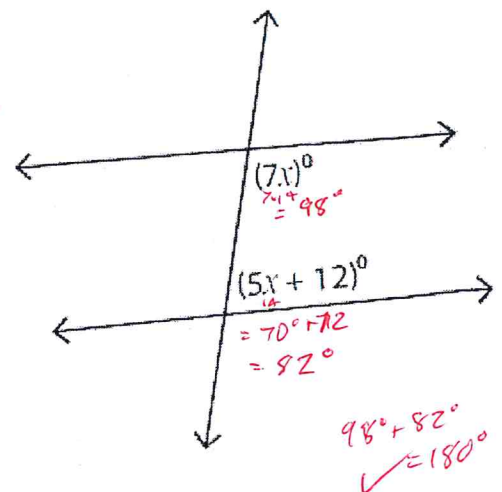
5. Pattern?

Interior Same Side or Interior Consecutive

Congruent ☐ Supplementary ☒

Solve for x -> Equation: $(7x) + (5x + 12) = 180^\circ$

$$\begin{aligned} 7x + 5x + 12 &= 180 \\ 12x + 12 &= 180 \\ 12x &= 180 - 12 \\ 12x &= 168 \\ x &= 14 \end{aligned}$$



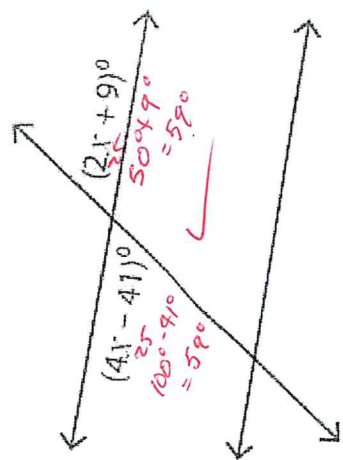
6. Pattern?

Opposite Angles

Congruent ☒ Supplementary ☐

Solve for x -> Equation:

$$\begin{aligned} (x - 41)^\circ &= (2x + 9)^\circ \\ x - 41^\circ &= 2x + 9^\circ \\ -x &= 50^\circ \\ x &= -50^\circ \end{aligned}$$



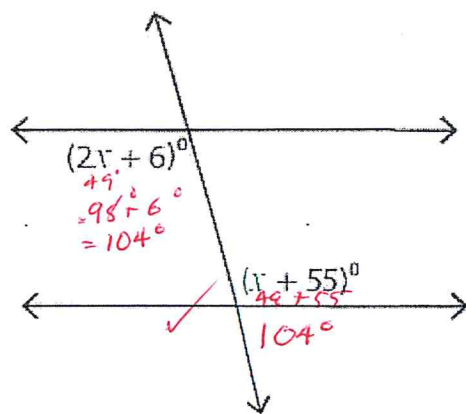
7. Pattern?

Alternating Interior

Congruent ☒ Supplementary ☐

Solve for x -> Equation:

$$\begin{aligned} (2x + 6)^\circ &= (x + 55)^\circ \\ 2x + 6^\circ &= x + 55^\circ \\ x &= 49^\circ \end{aligned}$$



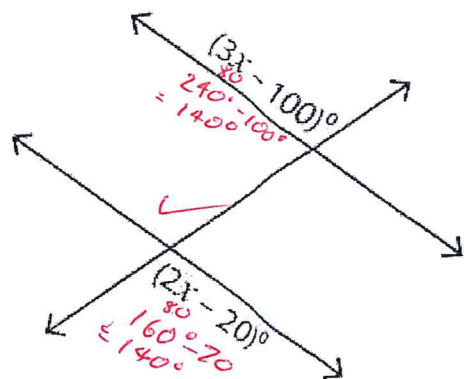
8. Pattern?

Alternating Exterior Angles

Congruent ☒ Supplementary ☐

Solve for x -> Equation:

$$\begin{aligned} (3x - 100)^\circ &= (2x - 20)^\circ \\ 3x - 100^\circ &= 2x - 20^\circ \\ x &= 80^\circ \end{aligned}$$

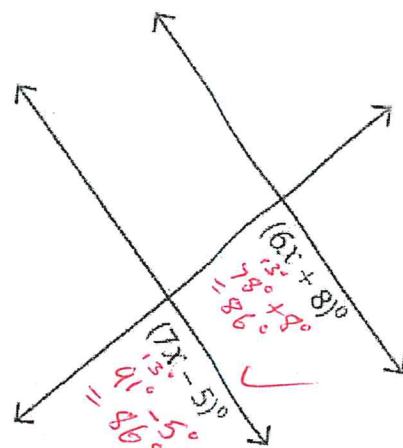


9. Pattern?

Corresponding Angles

Congruent ✓ Supplementary

Solve for x → Equation: $(6x+8)^\circ = (7x-5)^\circ$
 $8^\circ = x - 5^\circ$
 $13^\circ = x$

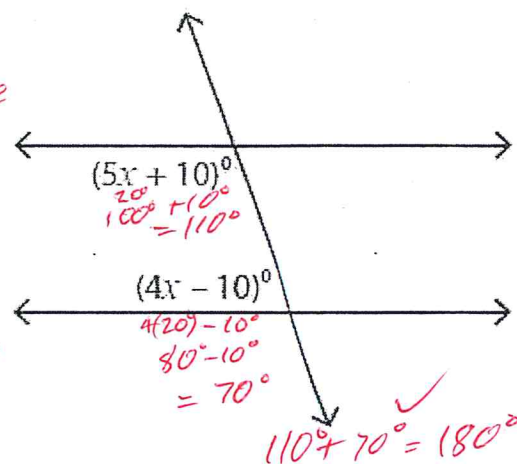


10. Pattern?

Same Side Interior or Interior Consecutive

Congruent Supplementary ✓

Solve for x → Equation: $(5x+10)^\circ + (4x-10)^\circ = 180^\circ$
 $9x = 180^\circ$
 $x = 20^\circ$



11. Pattern?

Same Side Exterior

Congruent Supplementary ✓

Solve for x → Equation: $(5x-14)^\circ + (3x+18)^\circ = 180^\circ$
 $8x + 4^\circ = 180^\circ$
 $8x = 176^\circ$
 $x = 22^\circ$

