Standard 7

ANGLES FORM BY A TRANSVERSAL

PARALLEL LINES CUT BY A TRANSVERSAL

PROBLEM 1

PROBLEM 2

PROBLEM 3

PROBLEM 4

PROBLEM 5

PROBLEM 6

PROBLEM 7A PROBLEM 7B

PROBLEM 8A PROBLEM 8B

PROBLEM 9A PROBLEM 9B

END SHOW

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STANDARD 7:

Students prove and use theorems involving the properties of parallel lines cut by a transversal, the properties of quadrilaterals, and properties of circles.

ESTÁNDAR 7:

Los estudiantes prueban y usan teoremas involucrando las propiedades de líneas paralelas cortadas por una transversal, las propiedades de cuadriláteros, y las propiedades de círculos.

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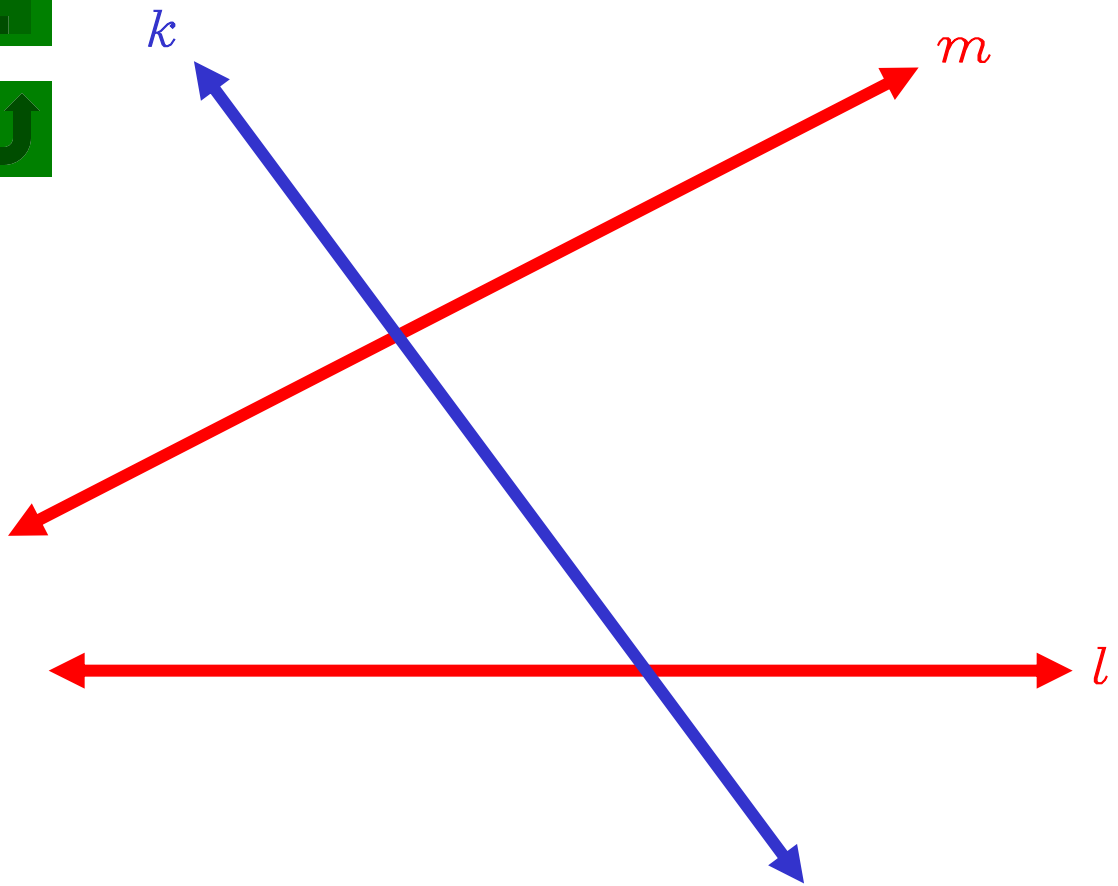
LINES CUT BY A TRANSVERSAL



Line k is a TRANSVERSAL cutting lines m and l.

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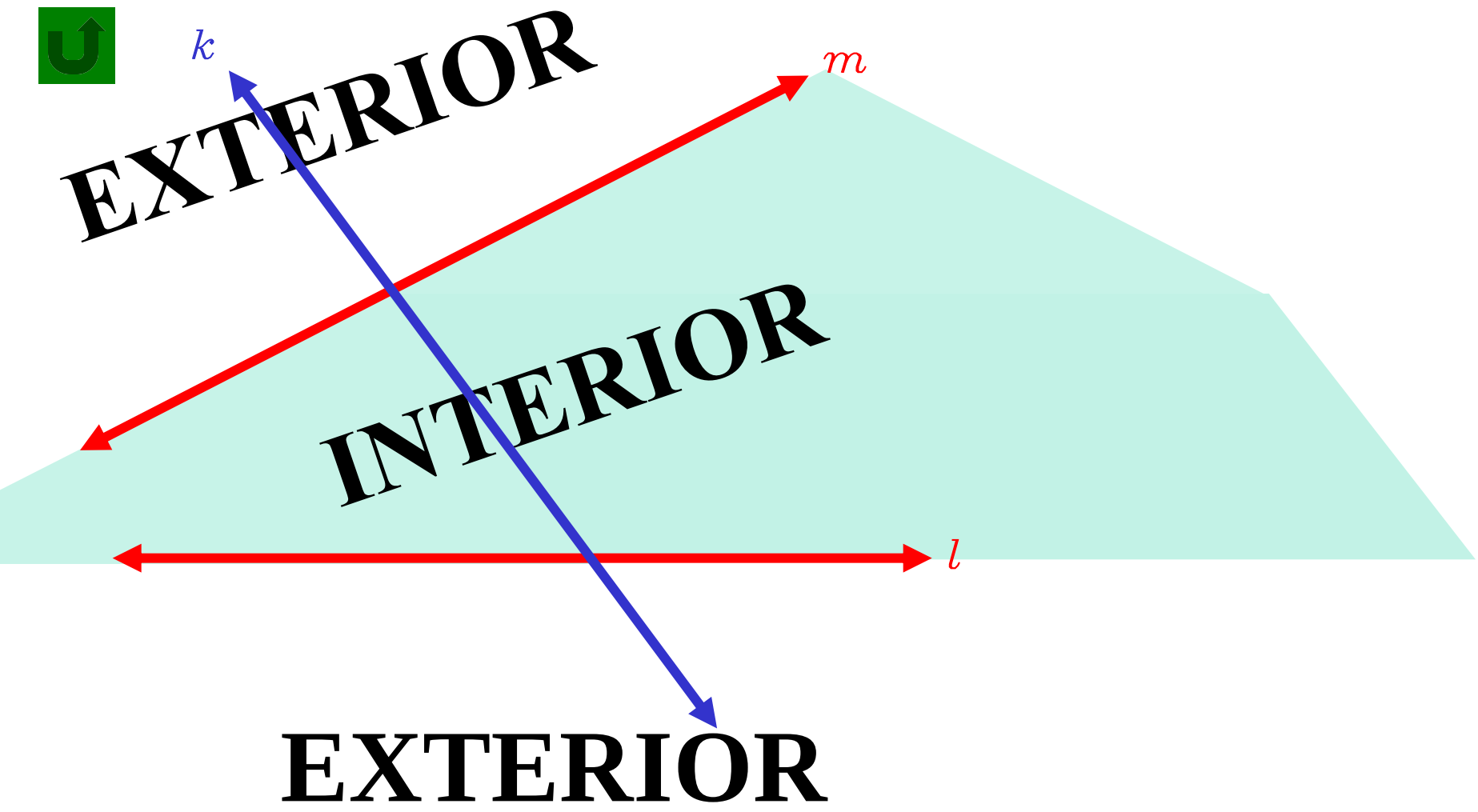

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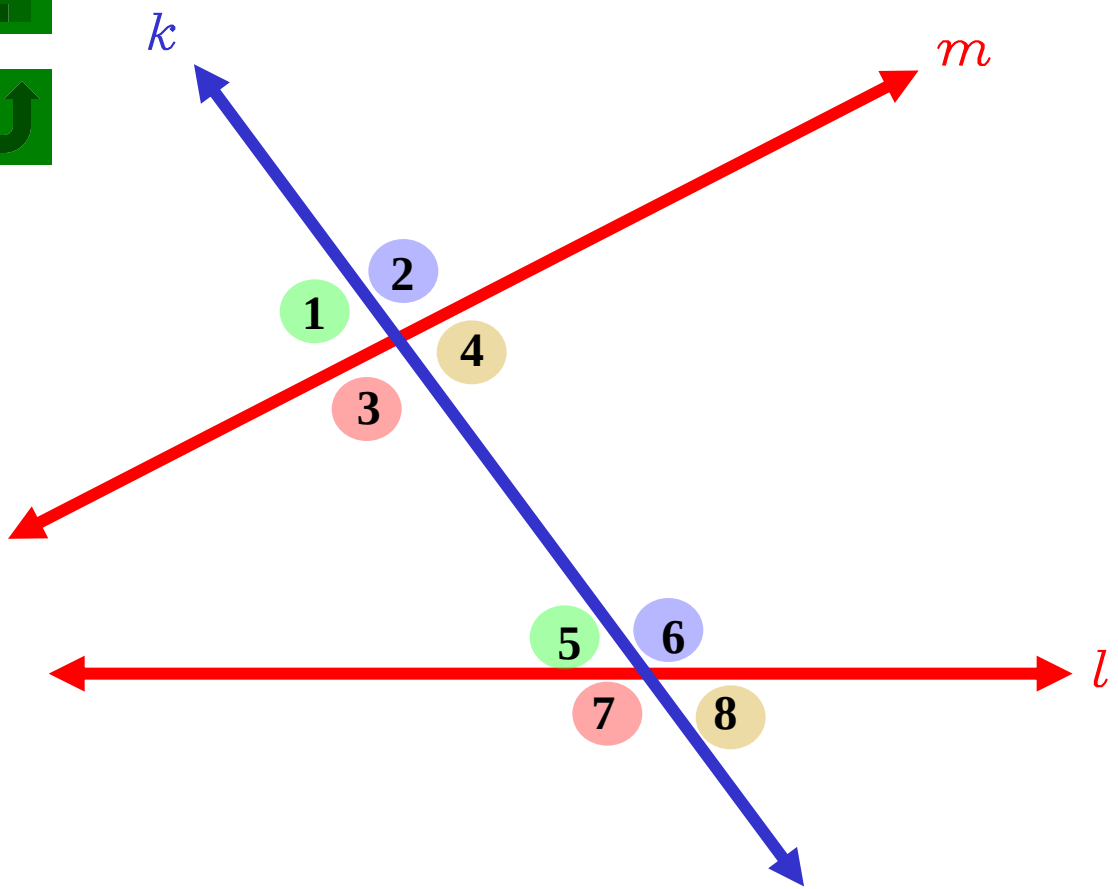
ANGLES FORMED BY A TRANSVERSAL

Standard 7



CORRESPONDING Angles:

$\angle 1$ and $\angle 5$

$\angle 3$ and $\angle 7$

$\angle 2$ and $\angle 6$

$\angle 4$ and $\angle 8$

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ANGLES FORMED BY A TRANSVERSAL

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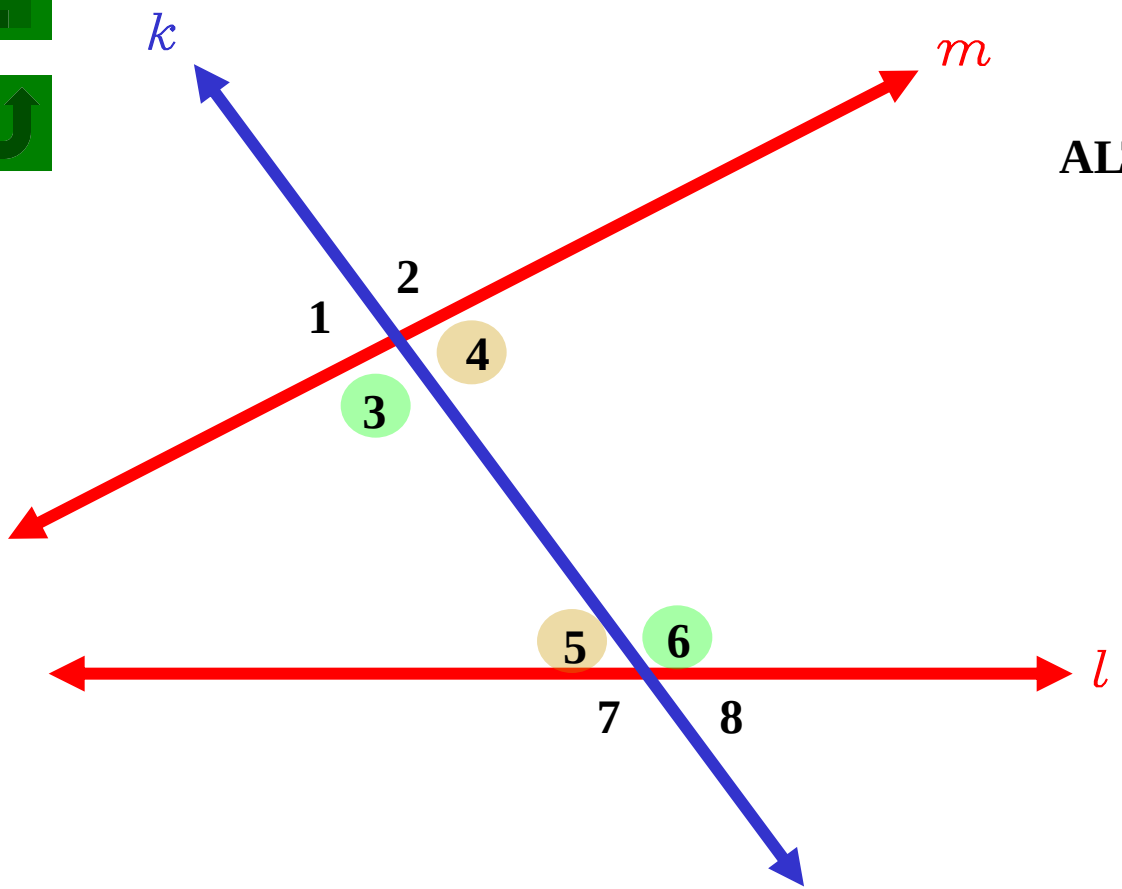

ALTERNATE INTERIOR Angles:

$\angle 3$ and $\angle 6$

$\angle 4$ and $\angle 5$

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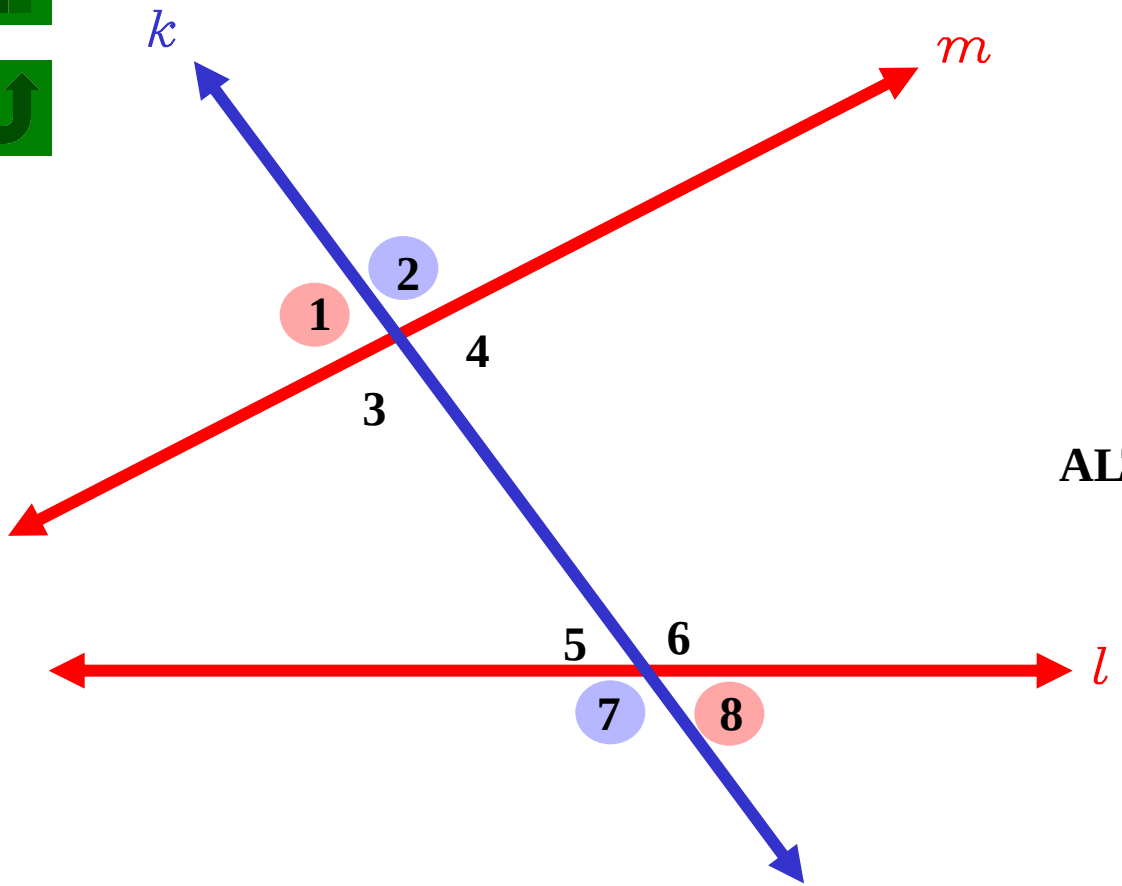

ALTERNATE EXTERIOR Angles:

$\angle 1$ and $\angle 8$

$\angle 7$ and $\angle 2$

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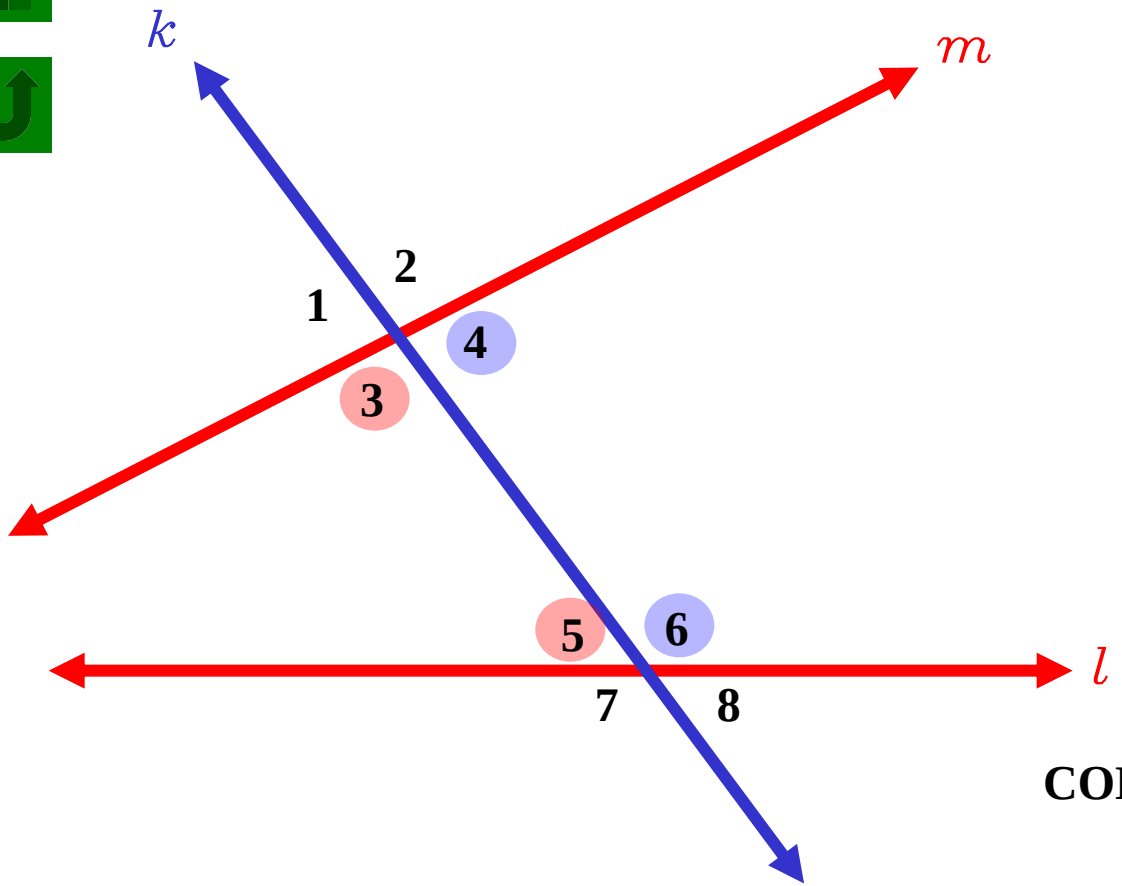

CONSECUTIVE INTERIOR Angles:

$\angle 3$ and $\angle 5$

$\angle 4$ and $\angle 6$

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ANGLES FORMED BY A TRANSVERSAL

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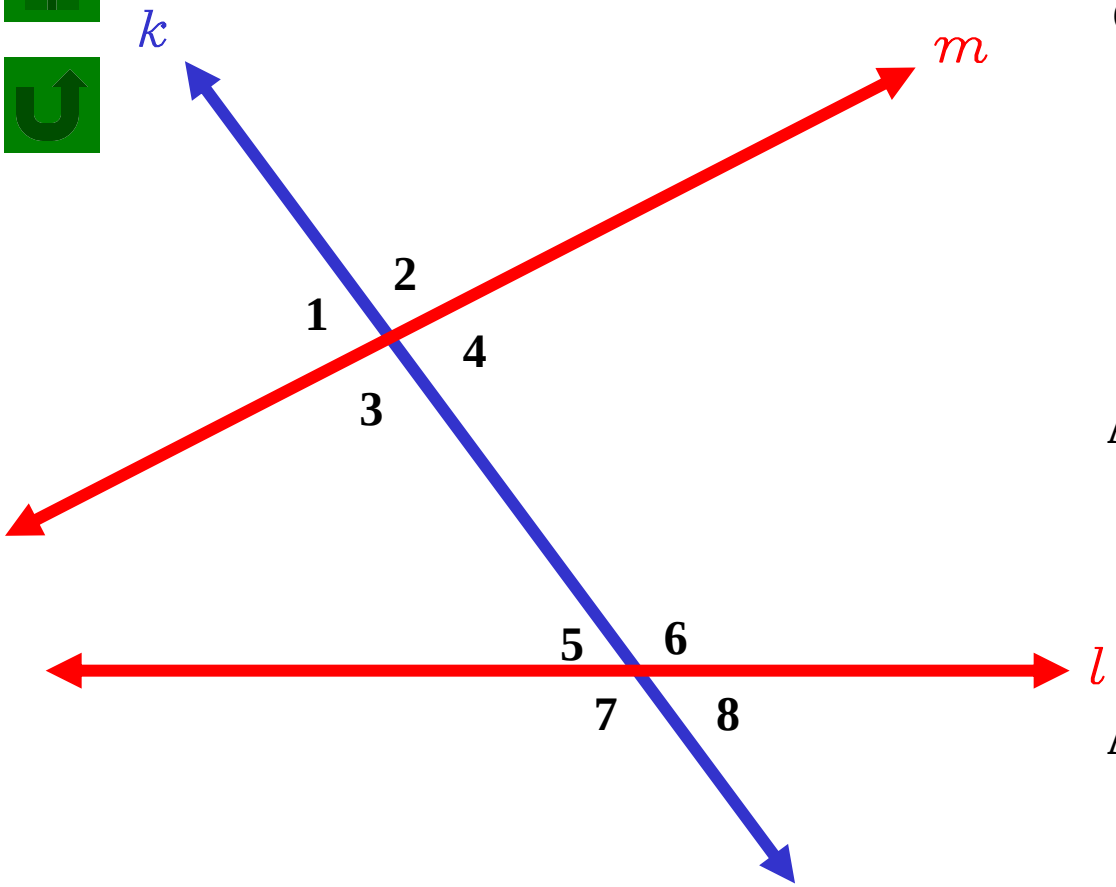

CORRESPONDING Angles:

$\angle 1$ and $\angle 5$

$\angle 3$ and $\angle 7$

$\angle 2$ and $\angle 6$

$\angle 4$ and $\angle 8$

ALTERNATE INTERIOR Angles:

$\angle 3$ and $\angle 6$

$\angle 4$ and $\angle 5$

ALTERNATE EXTERIOR Angles:

$\angle 1$ and $\angle 8$

$\angle 7$ and $\angle 2$

CONSECUTIVE Interior Angles:

$\angle 3$ and $\angle 5$

$\angle 4$ and $\angle 6$

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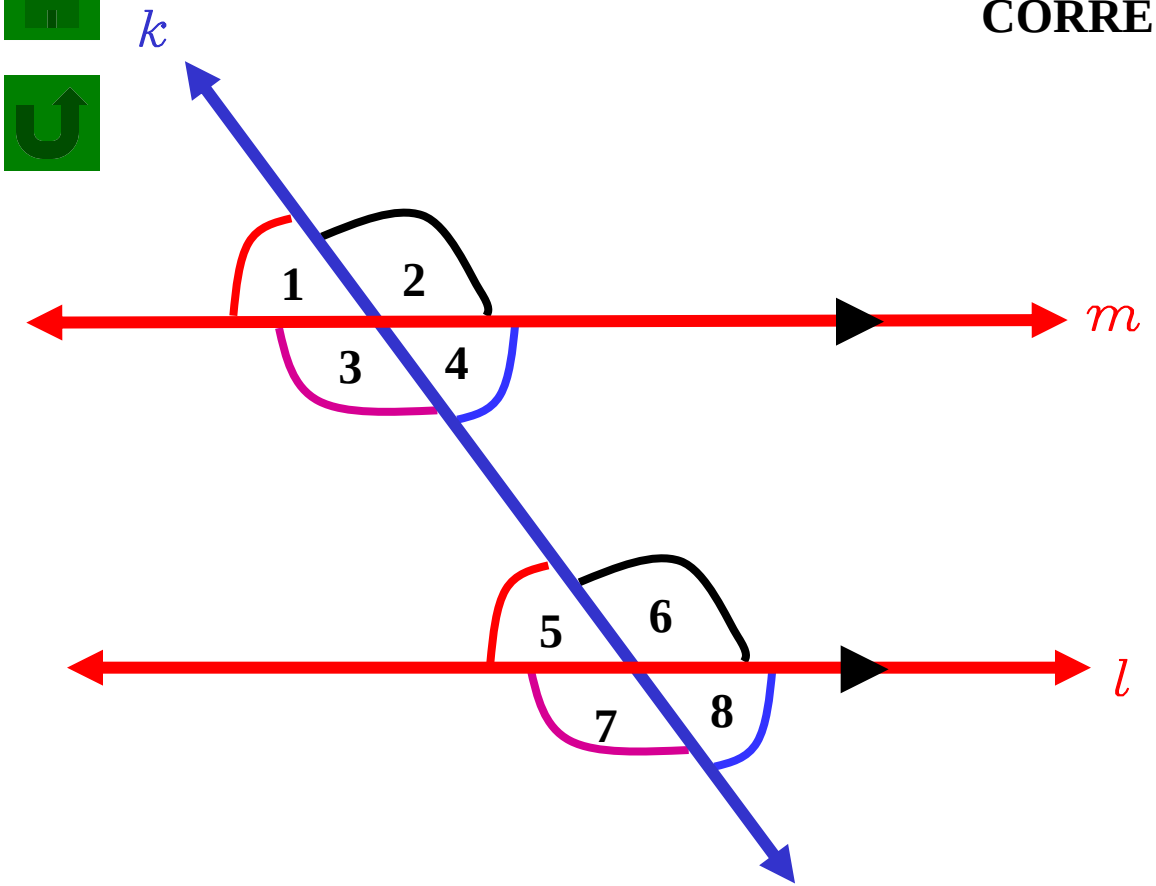
If both lines m and l are *PARALLEL* the following holds true:



CORRESPONDING Angles are $\cong$:

$\angle 1 \cong \angle 5$

$\angle 3 \cong \angle 7$

$\angle 2 \cong \angle 6$

$\angle 4 \cong \angle 8$

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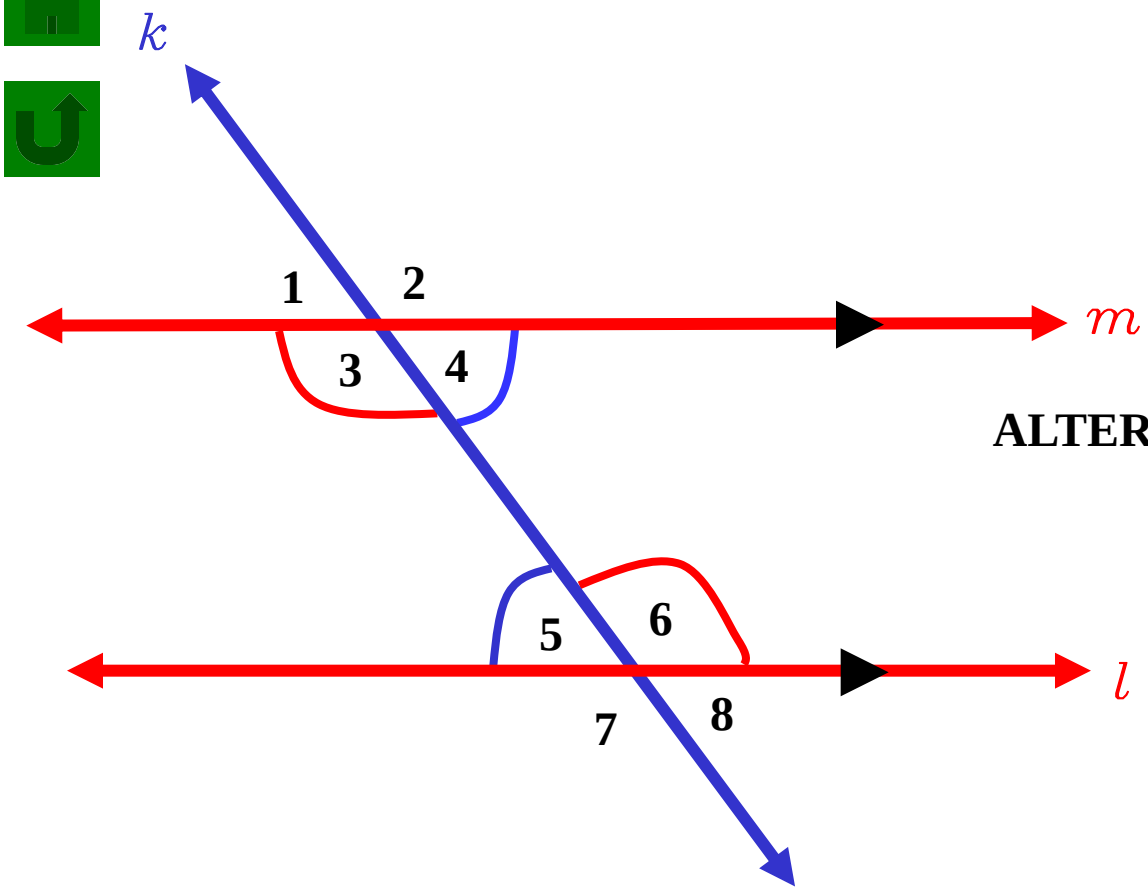
If both lines m and l are *PARALLEL* the following holds true:



ALTERNATE INTERIOR Angles are $\cong$:

$\angle 3 \cong \angle 6$

$\angle 4 \cong \angle 5$

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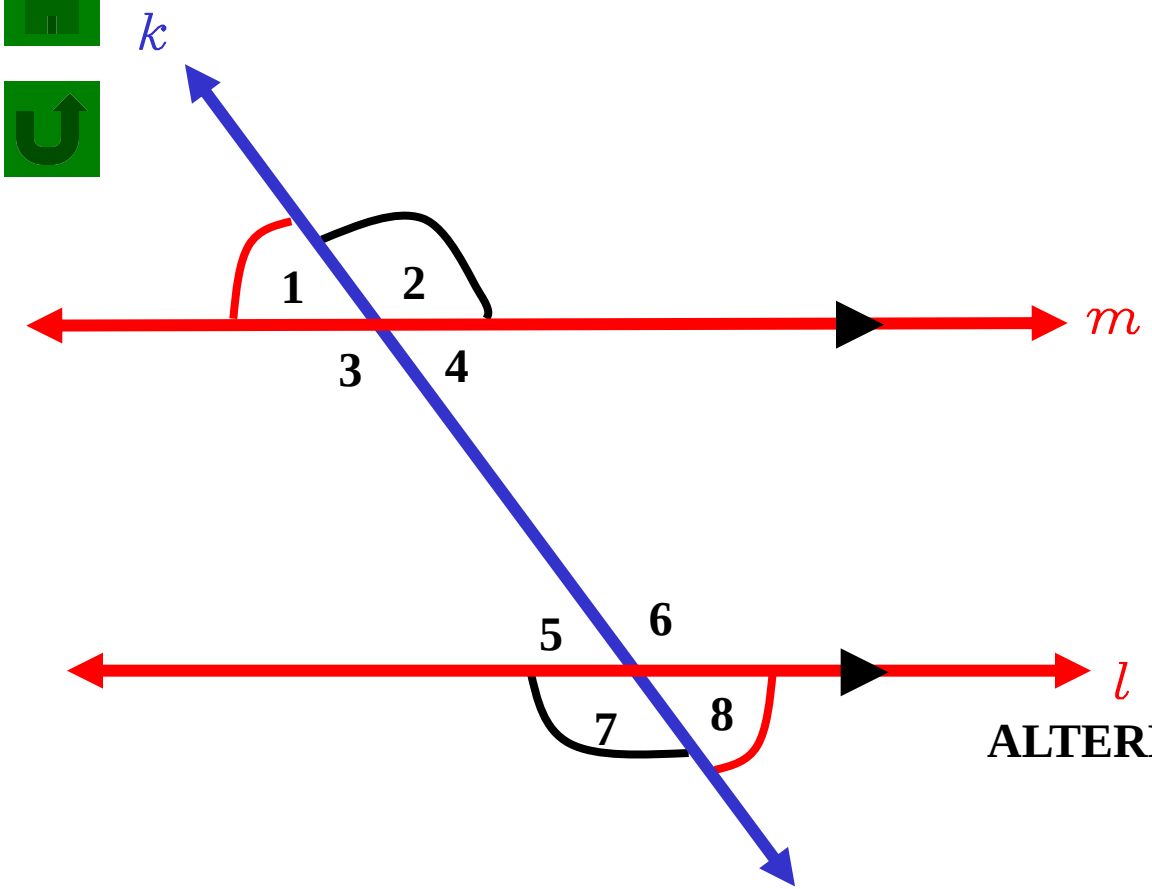
If both lines m and l are *PARALLEL* the following holds true:



ALTERNATE EXTERIOR Angles $\cong$:

$\angle 1 \cong \angle 8$

$\angle 7 \cong \angle 2$

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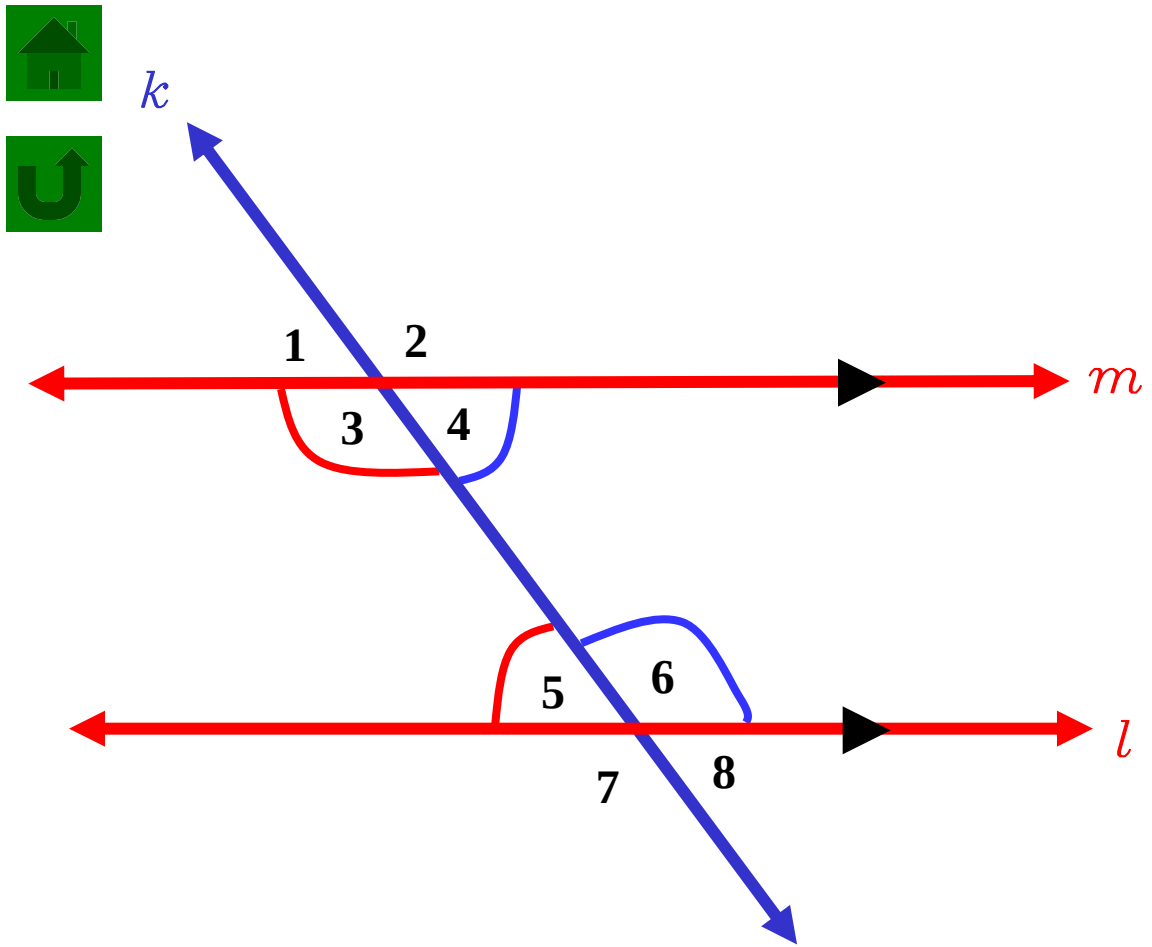
If both lines m and l are *PARALLEL* the following holds true:



CONSECUTIVE INTERIOR Angles are supplementary:

$m\angle 3 + m\angle 5 = 180°$

$m\angle 4 + m\angle 6 = 180°$

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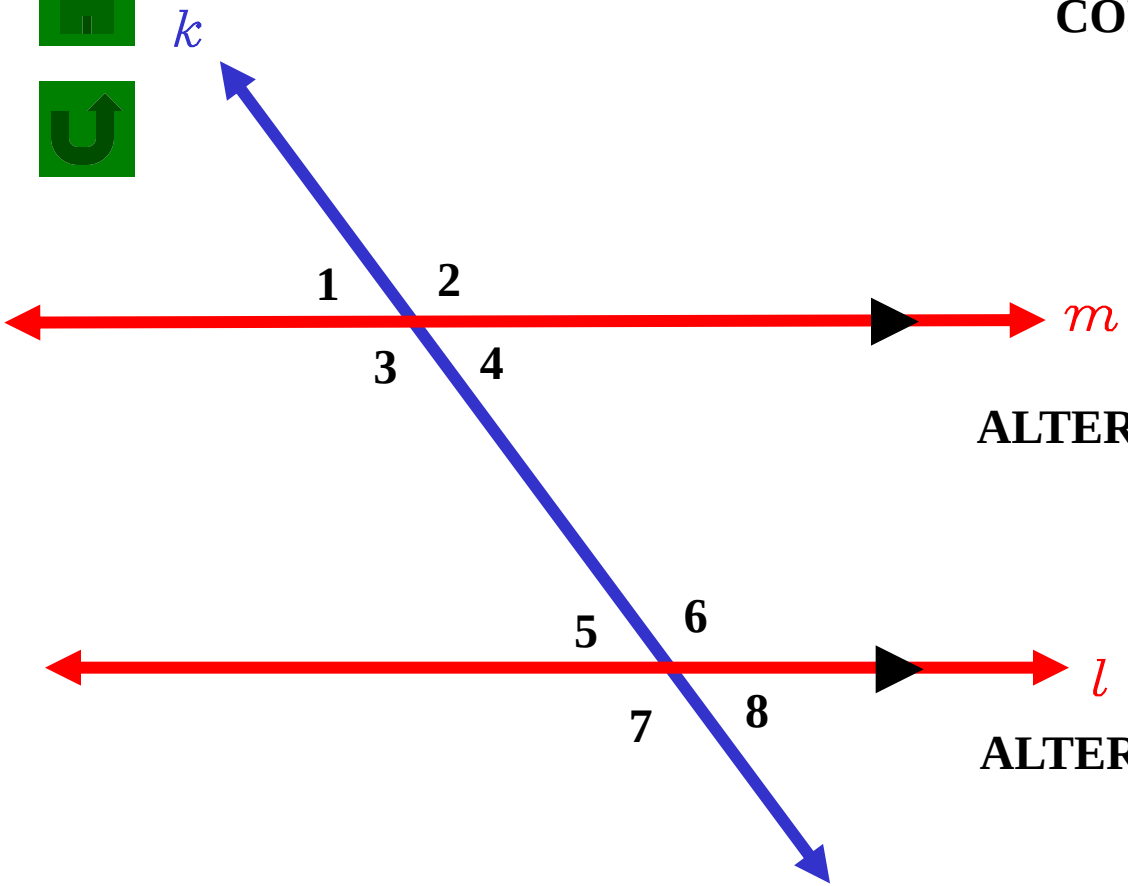
If both lines m and l are *PARALLEL* the following holds true:



CORRESPONDING Angles are $\cong$:

$\angle 1 \cong \angle 5$

$\angle 3 \cong \angle 7$

$\angle 2 \cong \angle 6$

$\angle 4 \cong \angle 8$

ALTERNATE INTERIOR Angles are $\cong$:

$\angle 3 \cong \angle 6$

$\angle 4 \cong \angle 5$

ALTERNATE EXTERIOR Angles $\cong$:

$\angle 1 \cong \angle 8$

$\angle 7 \cong \angle 2$

CONSECUTIVE Interior Angles are supplementary:

$m\angle 3 + m\angle 5 = 180°$

$m\angle 4 + m\angle 6 = 180°$

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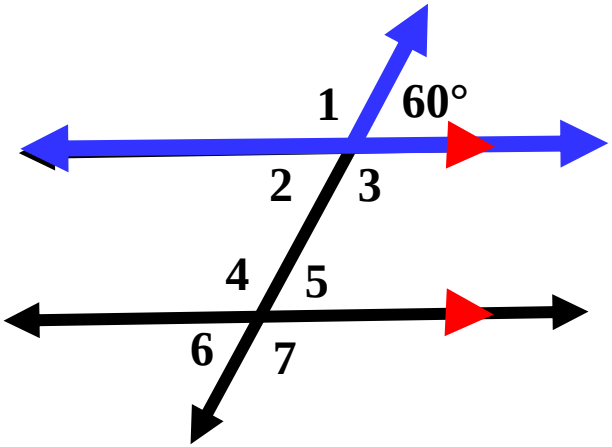
Find all angles in the figure:



What is the measure for ∠1?

60° + m∠1 = 180° **because they form a LINEAR PAIR**

-60 -60

m∠1 = 120°

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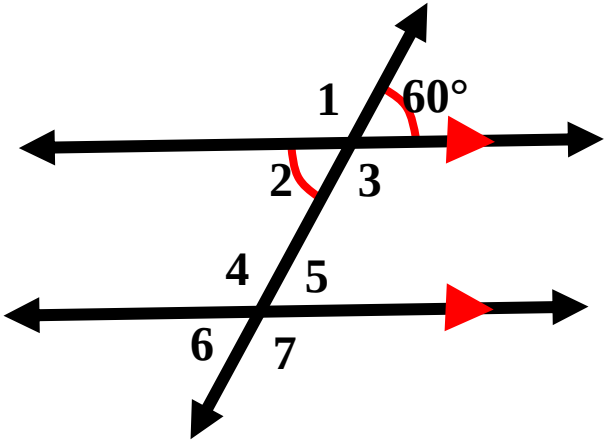
Find all angles in the figure:



What is the measure for $\angle 1$?

$60° + m\angle 1 = 180°$ **because they form a LINEAR PAIR**

$-60 \qquad\quad -60$

$m\angle 1 = 120°$

Now $\angle 2$ is vertical with 60° angle, so:

$m\angle 2 = 60°$

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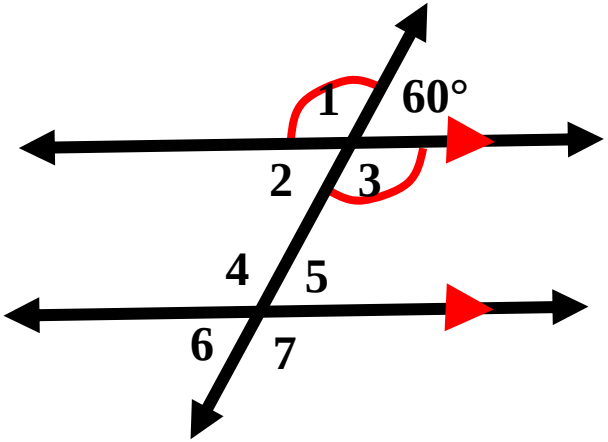
Find all angles in the figure:



What is the measure for $\angle 1$?

$60° + m\angle 1 = 180°$ because they form a
$-60 \qquad -60$ LINEAR PAIR

$m\angle 1 = 120°$

Now $\angle 2$ is vertical with 60° angle, so:

$m\angle 2 = 60°$

$\angle 1$ and $\angle 3$ are also vertical:

$m\angle 3 = m\angle 1$

$m\angle 3 = 120°$

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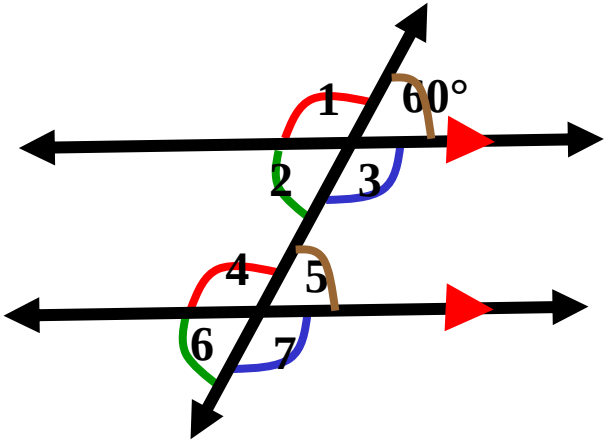
Find all angles in the figure:



What is the measure for ∠1?

$60° + m\angle 1 = 180°$ because they form a LINEAR PAIR

$-60 \qquad -60$

$m\angle 1 = 120°$

Now ∠2 is vertical with 60° angle, so:

$m\angle 2 = 60°$

∠1 and ∠3 are also vertical:

$m\angle 3 = m\angle 1$

$m\angle 3 = 120°$

Now all the following angles are CORRESPONDING, and ≅:

$\angle 1 \cong \angle 4 \longrightarrow m\angle 4 = 120°$

$\angle 2 \cong \angle 6 \longrightarrow m\angle 6 = 60°$

$\angle 3 \cong \angle 7 \longrightarrow m\angle 7 = 120°$

and finally:

$m\angle 5 = 60°$

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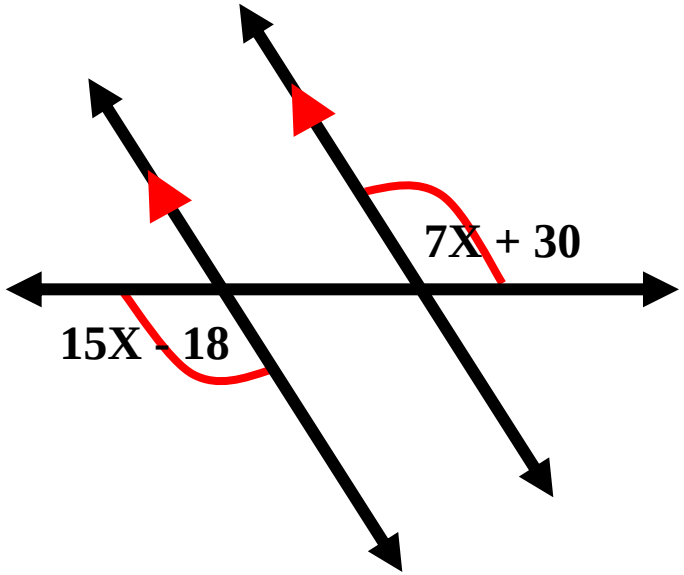
Find the value for X:



Both angles are ALTERNATE EXTERIOR and the lines are parallel, so the angles are ≅:

$$7X + 30 = 15X - 18$$
$$-30 \qquad -30$$
$$7X = 15X - 48$$
$$-15X \quad -15X$$
$$\frac{-8X}{-8} = \frac{-48}{-8}$$

$$\boxed{X = 6}$$

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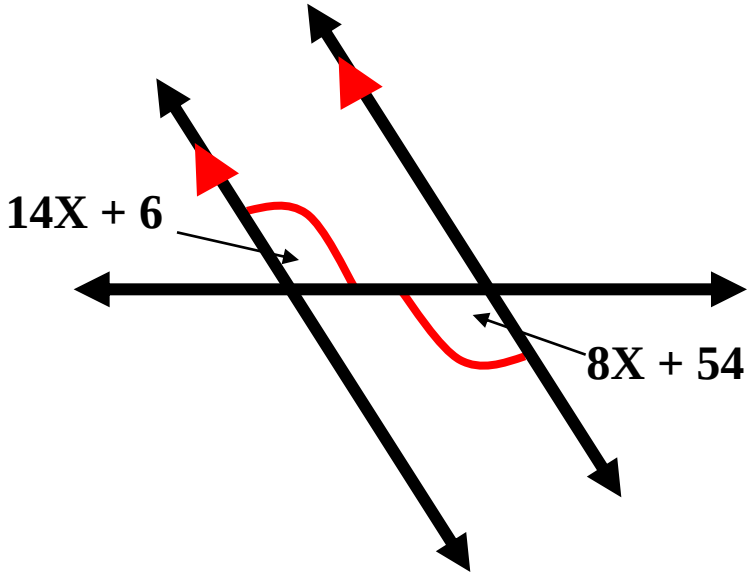
Find the value for X:



Both angles are ALTERNATE INTERIOR and the lines are parallel, so the angles are ≅:

$$14X + 6 = 8X + 54$$
$$-6 \qquad -6$$
$$14X = 8X + 48$$
$$-8X \quad -8X$$
$$\frac{6X}{6} = \frac{48}{6}$$

$$\boxed{X = 8}$$

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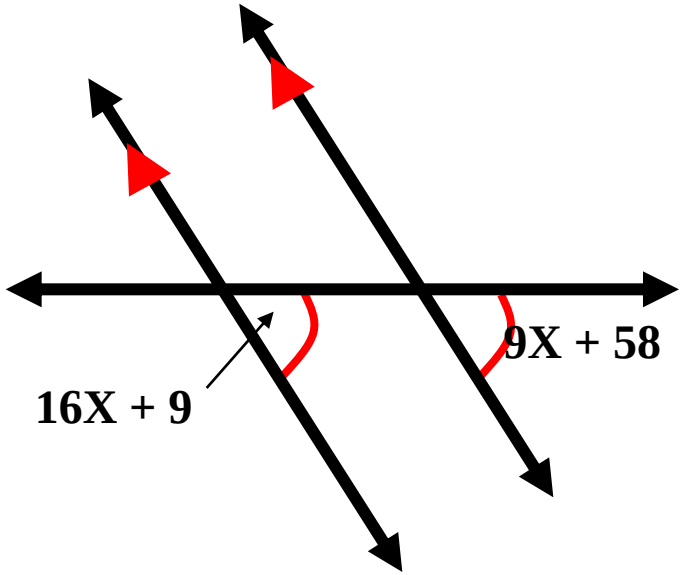
Find the value for X:



Both angles are CORRESPONDING and the lines are parallel, so the angles are ≅:

$$16X + 9 = 9X + 58$$
$$-9 \qquad -9$$
$$16X = 9X + 49$$
$$-9X \quad -9X$$
$$\frac{7X}{7} = \frac{49}{7}$$

$$\boxed{X = 7}$$

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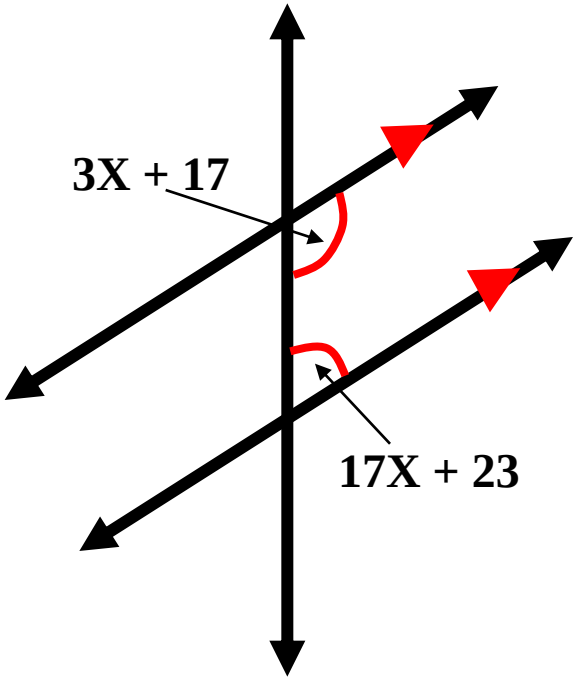
Find the value for X:



Both angles are CONSECUTIVE INTERIOR ANGLES, so they are SUPPLEMENTARY:

$$(3X + 17) + (17X + 23) = 180$$

$$3X + 17X + 17 + 23 = 180$$

$$20X + 40 = 180$$

$$-40 \quad -40$$

$$\frac{20X}{20} = \frac{140}{20}$$

$$\boxed{X = 7}$$

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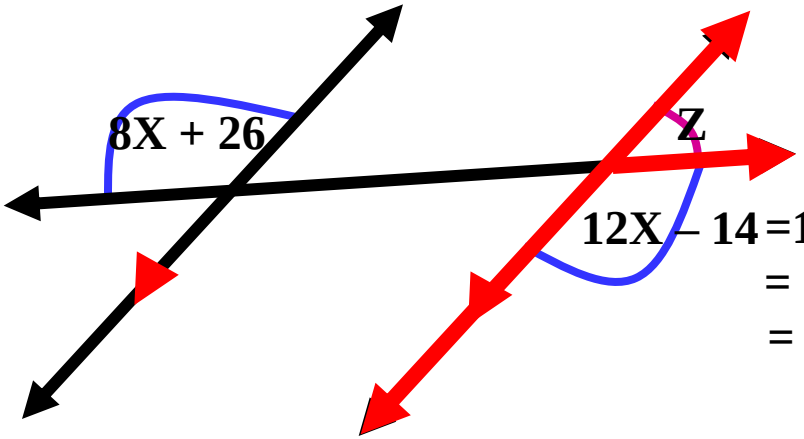
Find the value for X and Z:



$12X - 14 = 12(10) - 14$
$= 120 - 14$
$= 106°$

Both angles are ALTERNATE EXTERIOR :

$8X + 26 = 12X - 14$
$-26 \quad -26$
$8X = 12X - 40$
$-12X \quad -12X$
$-4X = -40$
$\frac{-4X}{-4} = \frac{-40}{-4}$

$X = 10$

Angles form a LINEAR PAIR:

$Z + 106° = 180°$
$-106 \quad -106$

$Z = 74$

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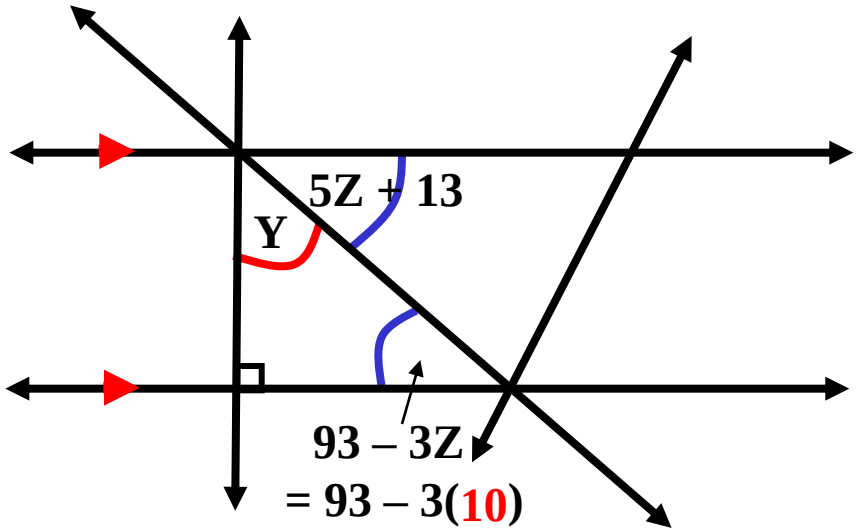
Find the value for Y and Z in the figure below:



$= 93 - 3(10)$

$= 93 - 30$

$= 63°$

These are complementary:

$Y + 63° = 90°$

$-63 \quad -63$

$\boxed{Y = 27°}$

Both angles are ALTERNATE INTERIOR :

$5Z + 13 = 93 - 3Z$

$-13 \quad -13$

$5Z = -3Z + 80$

$+3Z \quad +3Z$

$\frac{8Z}{8} = \frac{80}{8}$

$\boxed{Z = 10}$

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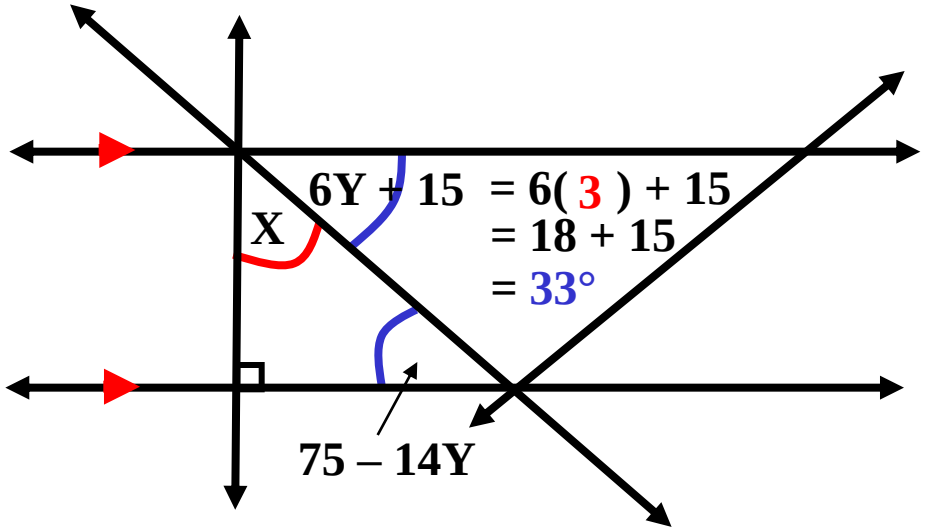
Find the value for X and Y in the figure below:



These are complementary:

$X + 33° = 90°$

$-33 \quad -33$

$\boxed{X = 57°}$

Both angles are ALTERNATE INTERIOR :

$6Y + 15 = 75 - 14Y$

$-15 \quad -15$

$6Y = -14Y + 60$

$+14Y \quad +14Y$

$\frac{20Y}{20} = \frac{60}{20}$

$\boxed{Y = 3}$

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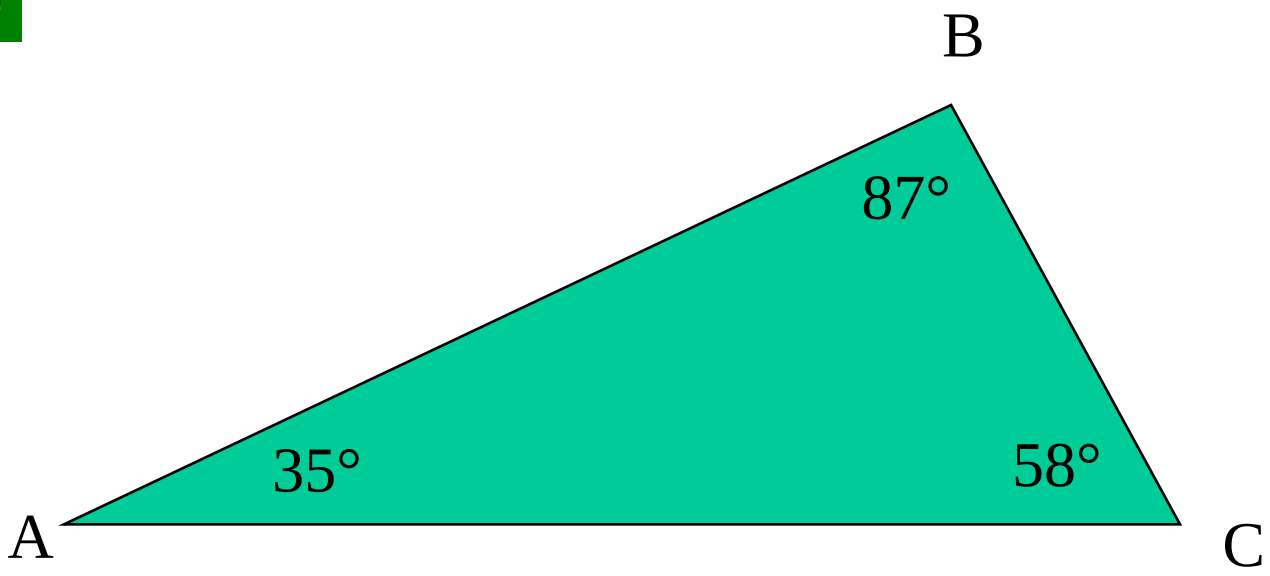
ANGLE SUM THEOREM:



$$\mathbf{m}\angle A + \mathbf{m}\angle B + \mathbf{m}\angle C = 180°$$

$$35° + 87° + 58° = 180°$$

The sum of the interior angles of a triangle is *always 180°*

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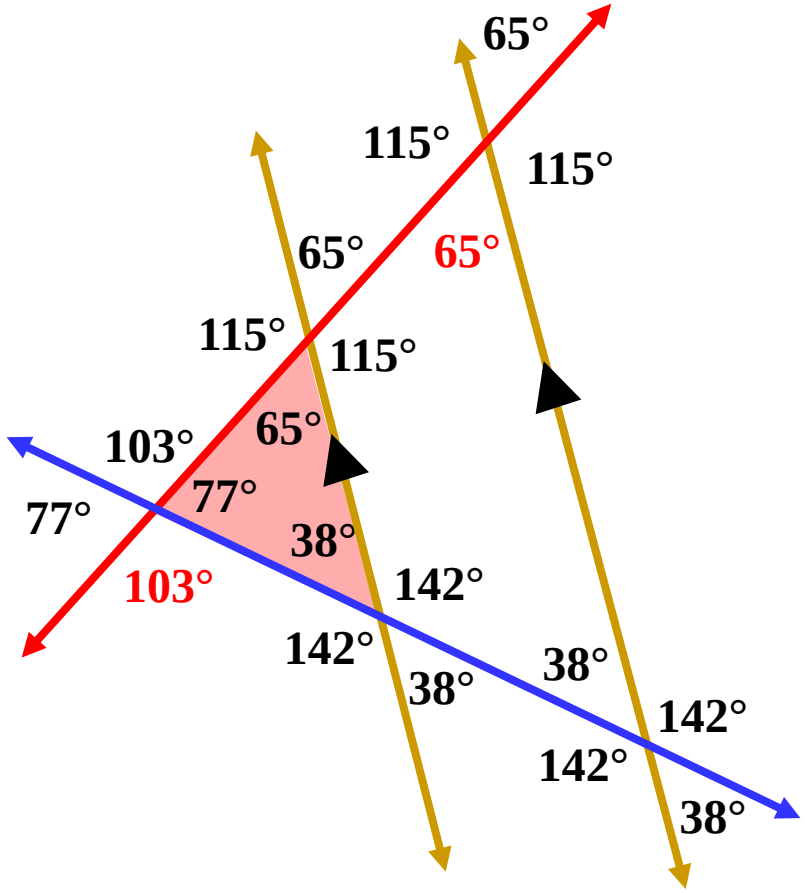
Find all the unknown angles in the figure below:



1. Vertical Angles

2. Linear pair:

   180°-103° = 77°

   180°-65°= 115°

3. Corresponding Angles

4. Vertical Angles

5. Linear Pair:

   180°-65°= 115°

6. Interior Angle Sum in triangle is 180°:

   180°-77°-65° = 38°

7. Vertical Angles

8. Corresponding Angles

9. Linear Pair

   180°-38°= 142°

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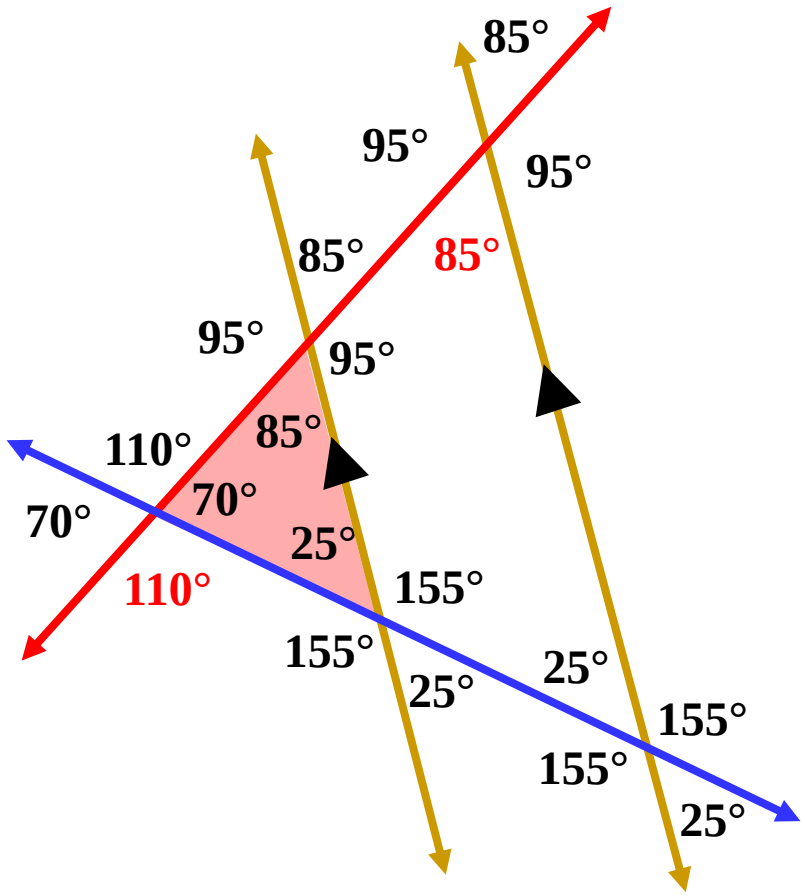
Find all the unknown angles in the figure below:



1. Vertical Angles

2. Linear pair:

   180°-110° = 70°

   180°-85°= 95°

3. Corresponding Angles

4. Vertical Angles

5. Linear Pair:

   180°-85°= 95°

6. Interior Angle Sum in triangle is 180°:

   180°-70°-85° = 25°

7. Vertical Angles

8. Corresponding Angles

9. Linear Pair

   180°-25°= 155°

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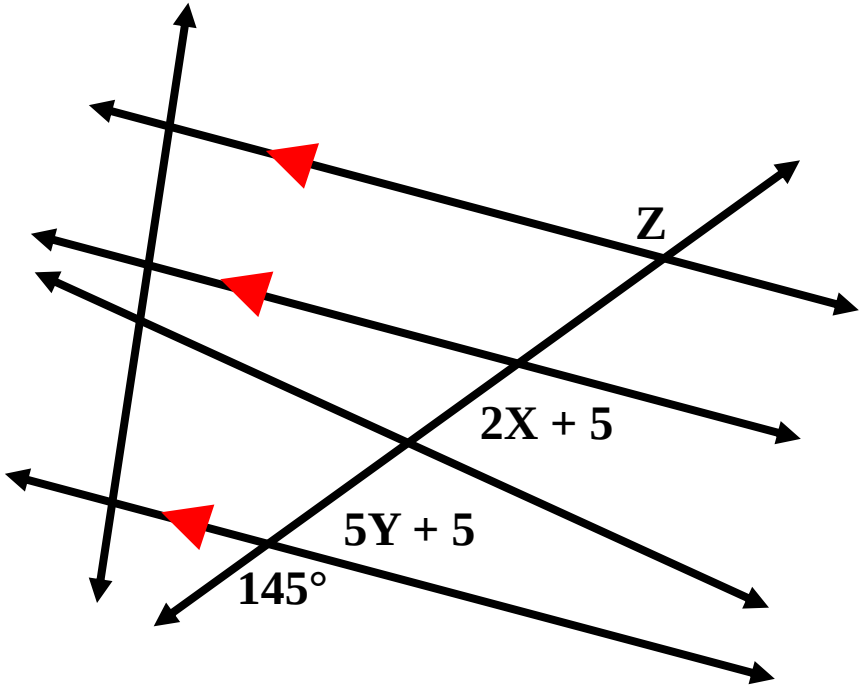
Find the value for X, Y and Z in the figure below:

Standard 7



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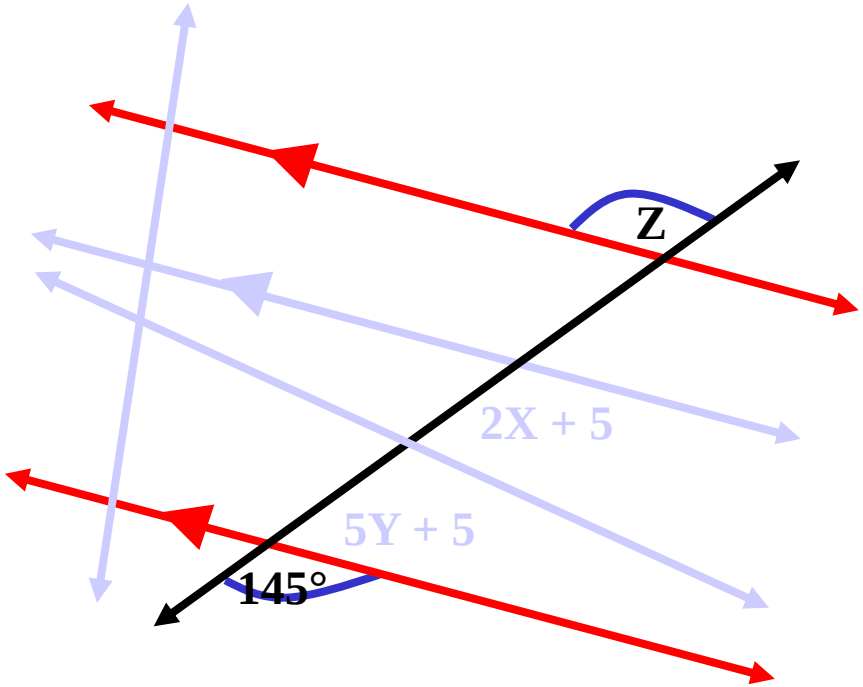

Alternate Exterior Angles:

Z = 145°

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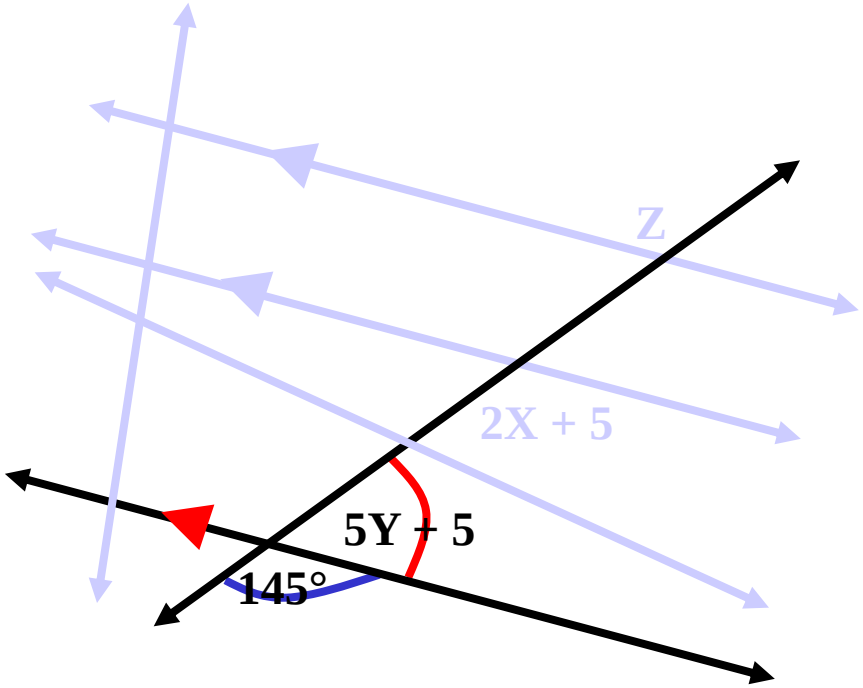
Find the value for X, Y and Z in the figure below:

Standard 7



Alternate Exterior Angles:

$Z = 145°$

Linear Pair and supplementary:

$$145° + (5Y + 5)° = 180°$$

$$150 + 5Y = 180$$

$$-150 \qquad -150$$

$$\frac{5Y}{5} = \frac{30}{5}$$

$$Y = 6$$

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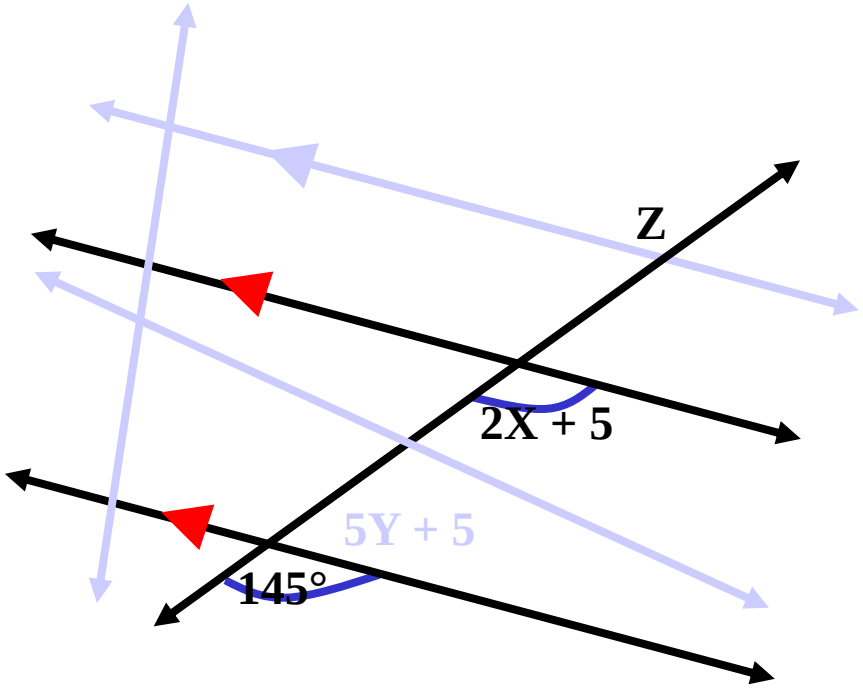
Find the value for X, Y and Z in the figure below:

Standard 7



Alternate Exterior Angles:

$Z = 145°$

Linear Pair and supplementary:

$145° + (5Y + 5)° = 180°$

$150 + 5Y = 180$

$-150 \qquad -150$

$\frac{5Y}{5} = \frac{30}{5}$

$Y = 6$

Corresponding angles:

$2X + 5 = 145°$

$-5 \qquad -5$

$\frac{2X}{2} = \frac{140}{2}$

$X = 70$

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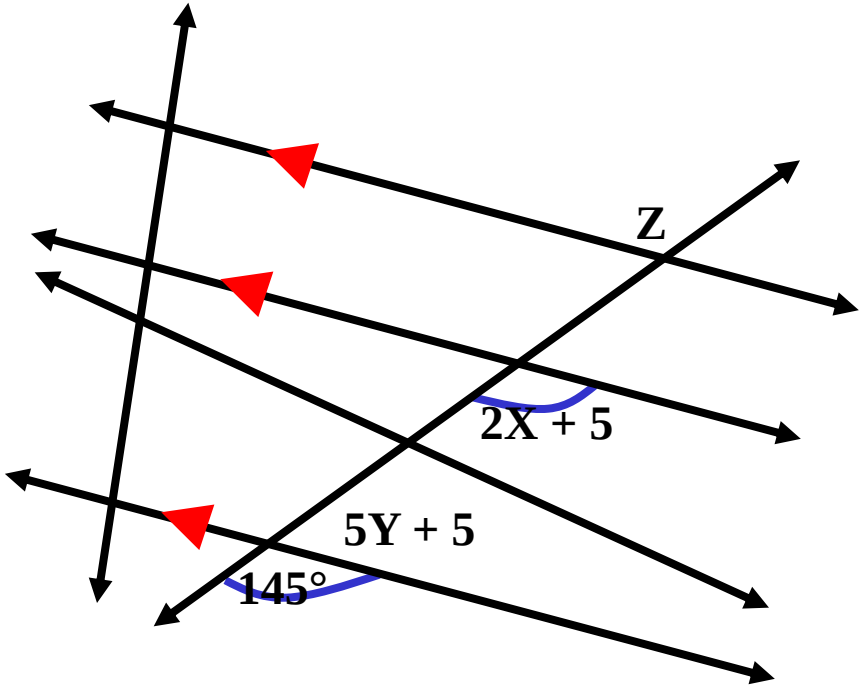
Find the value for X, Y and Z in the figure below:



Alternate Exterior Angles:

$Z = 145°$

Linear Pair and supplementary:

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$150 + 5Y = 180$

$-150 \quad -150$

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Corresponding angles:

$2X + 5 = 145°$

$-5 \quad -5$

$\frac{2X}{2} = \frac{140}{2}$

$X = 70$

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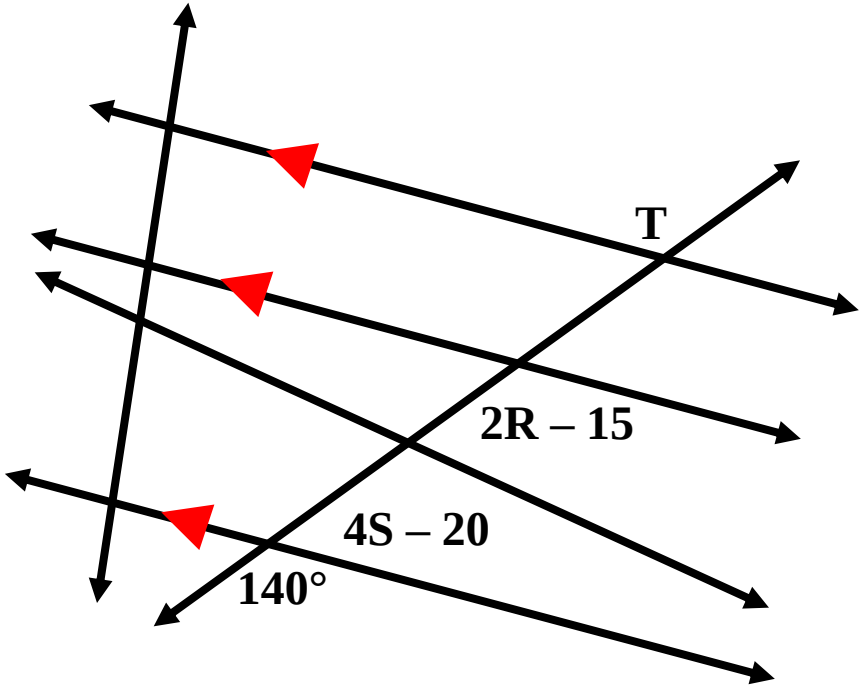
Find the value for R, S and T in the figure below:

Standard 7



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Find the value for R, S and T in the figure below:

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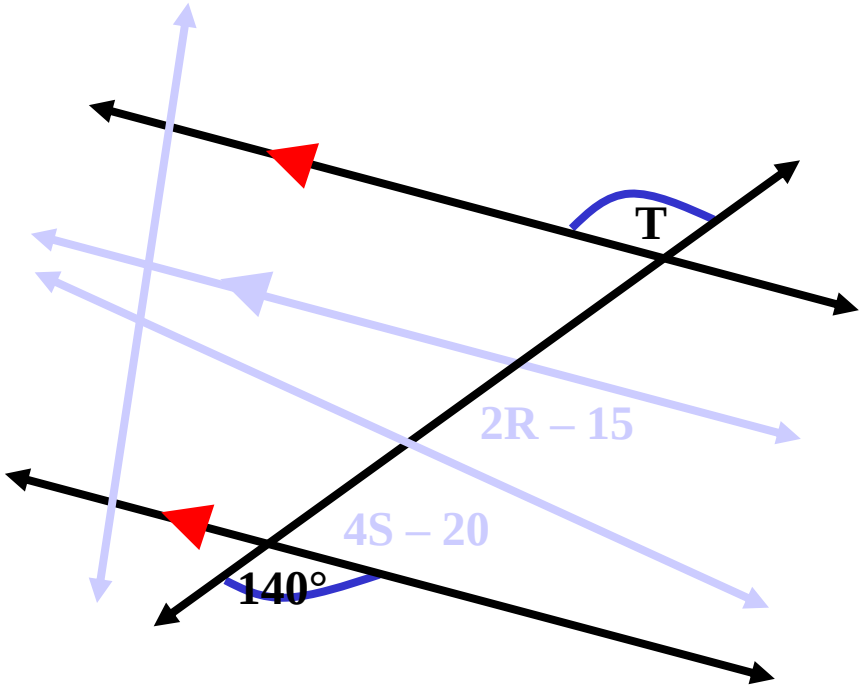

Alternate Exterior Angles:

T = 140°

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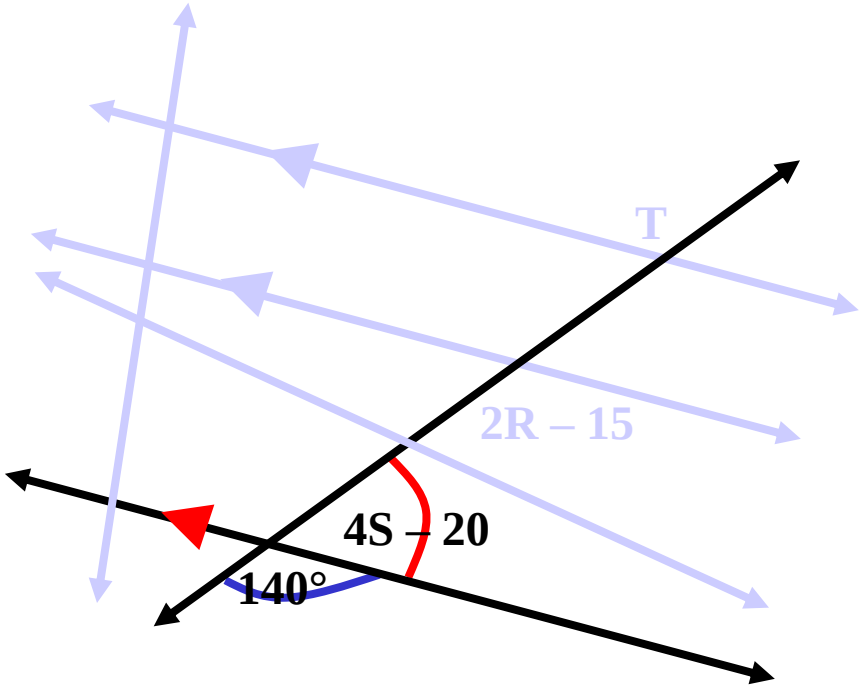
Find the value for R, S and T in the figure below:

Standard 7



Alternate Exterior Angles:

$T = 140°$

Linear Pair and supplementary:

$140° + (4S - 20)° = 180°$

$120 + 4S = 180$

$-120 \qquad -120$

$\frac{4S}{4} = \frac{60}{4}$

$S = 15$

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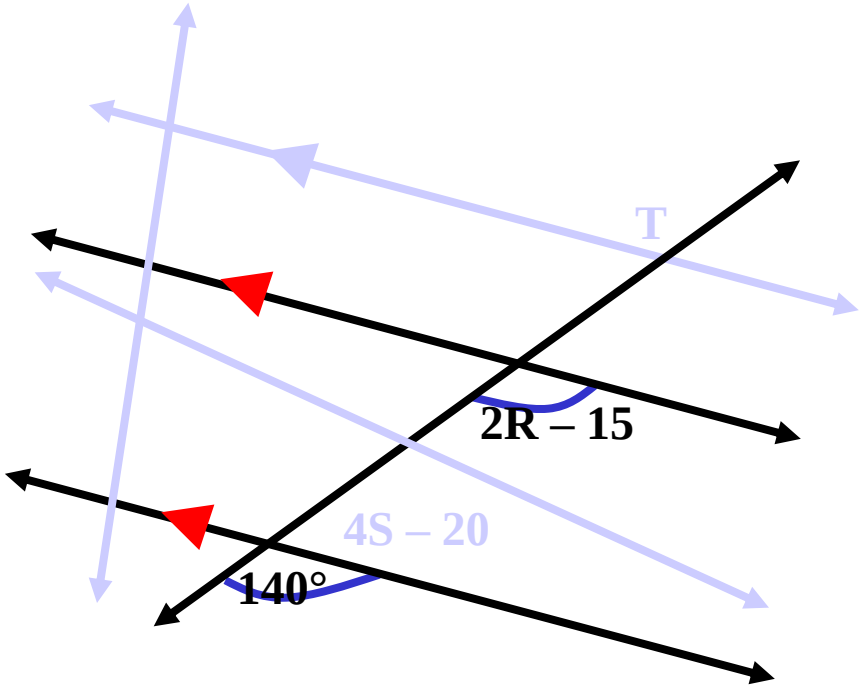
Find the value for R, S and T in the figure below:



Alternate Exterior Angles:

$Z = 140°$

Linear Pair and supplementary:

$140° + (4S - 20)° = 180°$

$120 + 4S = 180$

$-120 \quad -120$

$\frac{4S}{4} = \frac{60}{4}$

$S = 15$

Corresponding angles:

$2R - 15 = 140°$

$+15 \quad +15$

$\frac{2R}{2} = \frac{155}{2}$

$R = 77.5$

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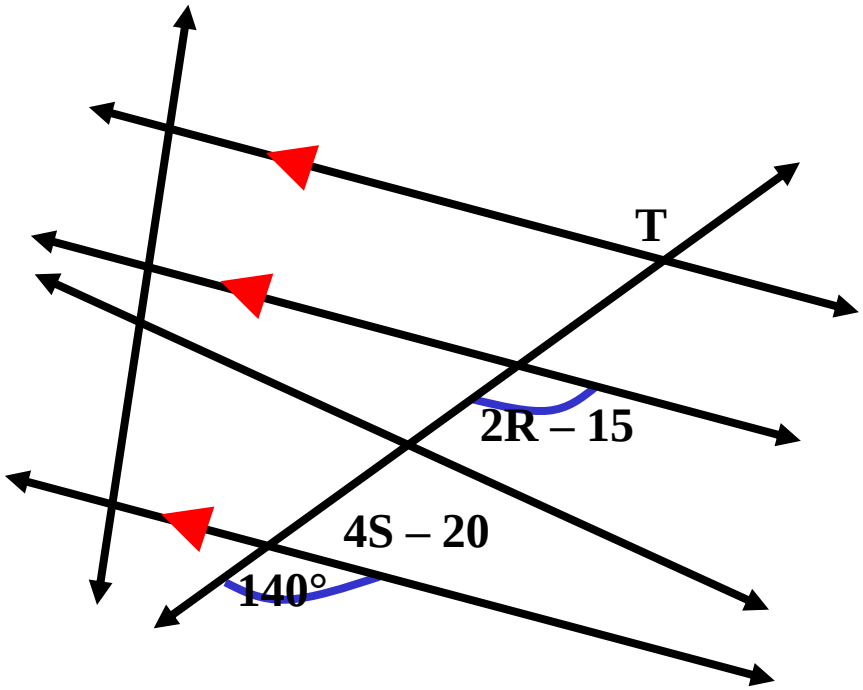
Find the value for R, S and T in the figure below:



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