

Lesson 2: Parallel Lines Cut by a Transversal and Algebra (Day 2)

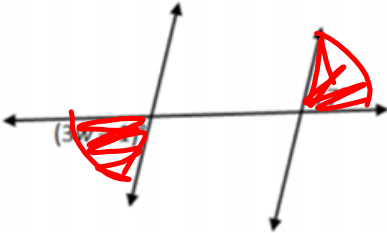
Do Now:

Classwork



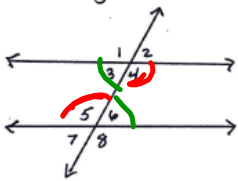
Each diagram is formed by two parallel lines and a transversal. Write the equation you can use to find the value of the variable. Then find the value of the variable.

- 1. *Alternate Exterior \angle 's*
Geometry Fact:
Equation:



Work with a partner to fill in the following worksheet! There are colored pencils in the back of the room.

Alternate Interior Angles

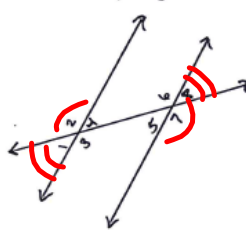


Basic Rigid Motion:

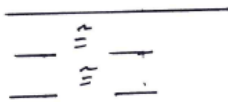
180° Rotation

$m\angle 4 \cong m\angle 5$ ← congruent
 $m\angle 3 \cong m\angle 6$

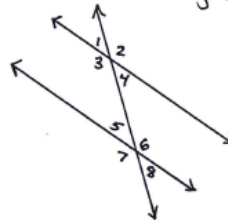
Alternate Exterior Angles



Basic Rigid Motion:



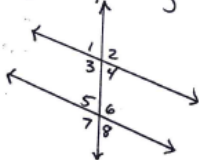
Vertical Angles



Basic Rigid Motion:



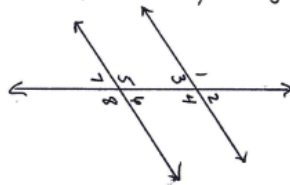
Corresponding Angles



Basic Rigid Motion:



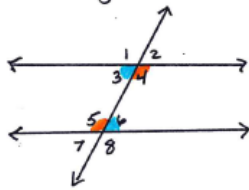
Supplementary Angles



$___ + ___ = 180$ $___ + ___ = 180$ $___ + ___ = 180$
 $___ + ___ = 180$ $___ + ___ = 180$ $___ + ___ = 180$
 $___ + ___ = 180$ $___ + ___ = 180$ $___ + ___ = 180$

Sample

Alternate Interior Angles



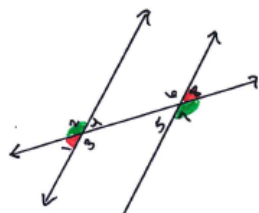
Basic Rigid Motion:

180° Rotation

$$\underline{m\angle 3} \cong \underline{m\angle 6}$$

$$\underline{m\angle 4} \cong \underline{m\angle 5}$$

Alternate Exterior Angles



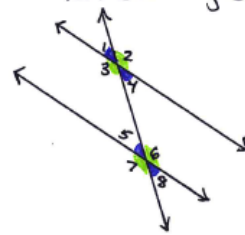
Basic Rigid Motion:

180° Rotation

$$\underline{m\angle 1} \cong \underline{m\angle 8}$$

$$\underline{m\angle 2} \cong \underline{m\angle 7}$$

Vertical Angles



Basic Rigid Motion:

Reflection

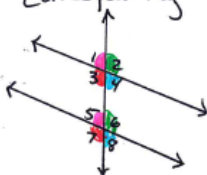
$$\underline{m\angle 1} \cong \underline{m\angle 3}$$

$$\underline{m\angle 2} \cong \underline{m\angle 4}$$

$$\underline{m\angle 5} \cong \underline{m\angle 8}$$

$$\underline{m\angle 6} \cong \underline{m\angle 7}$$

Corresponding Angles



Basic Rigid Motion:

Translation

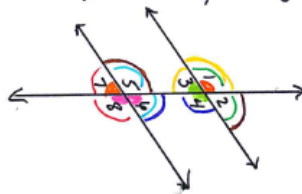
$$\underline{m\angle 1} \cong \underline{m\angle 5}$$

$$\underline{m\angle 2} \cong \underline{m\angle 6}$$

$$\underline{m\angle 3} \cong \underline{m\angle 7}$$

$$\underline{m\angle 4} \cong \underline{m\angle 8}$$

Supplementary Angles



$$\underline{m\angle 1} + \underline{m\angle 2} = 180$$

$$\underline{m\angle 2} + \underline{m\angle 3} = 180$$

$$\underline{m\angle 3} + \underline{m\angle 4} = 180$$

$$\underline{m\angle 4} + \underline{m\angle 1} = 180$$

$$\underline{m\angle 5} + \underline{m\angle 6} = 180$$

$$\underline{m\angle 6} + \underline{m\angle 7} = 180$$

$$\underline{m\angle 7} + \underline{m\angle 8} = 180$$

$$\underline{m\angle 8} + \underline{m\angle 5} = 180$$

$$\underline{m\angle 1} + \underline{m\angle 5} = 180$$

$$\underline{m\angle 2} + \underline{m\angle 6} = 180$$

$$\underline{m\angle 3} + \underline{m\angle 7} = 180$$

$$\underline{m\angle 4} + \underline{m\angle 8} = 180$$

2. Geometry Fact: **Supplementary \angle 's**

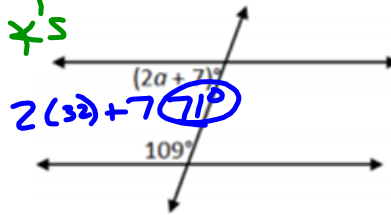
Equation:

$$2a + 7 + 109 = 180$$

$$\begin{array}{r} 2a + 116 = 180 \\ -116 \quad -116 \\ \hline \end{array}$$

$$\begin{array}{r} 2a = 64 \\ \frac{2}{2} \quad \frac{2}{2} \\ \hline \end{array}$$

$$\boxed{a = 32}$$

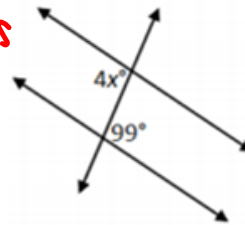


3. Geometry Fact: **Alternate Interior \angle 's**

Equation:

$$\begin{array}{r} 4x = 99 \\ \frac{4}{4} \quad \frac{4}{4} \\ \hline \end{array}$$

$$\boxed{x = 24.75}$$



4. Geometry Fact: **Supplementary**

Equation:

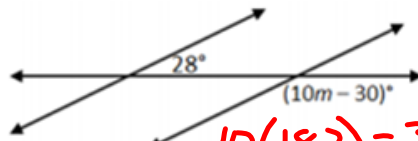
$$28 + (10m - 30) = 180$$

$$28 + 10m - 30 = 180$$

$$\begin{array}{r} 10m - 2 = 180 \\ +2 \quad +2 \\ \hline \end{array}$$

$$\begin{array}{r} 10m = 182 \\ \cancel{10} \quad \cancel{10} \\ \hline \end{array}$$

$$m = 18.2$$



$$\begin{array}{l} 10(18.2) - 30 \\ 182 - 30 = 152^\circ \end{array}$$

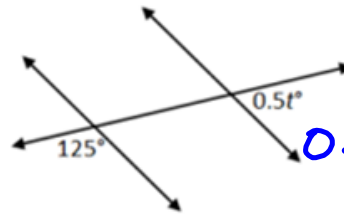
5. Geometry Fact: **Supplementary** #'s

Equation:

$$0.5t + 125 = 180$$

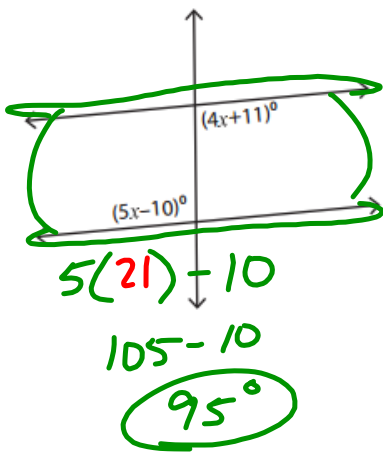
$$\begin{array}{r} 0.5t = 55 \\ \cancel{0.5} \quad \cancel{0.5} \\ \hline \end{array}$$

$$t = 110$$



$$\begin{array}{l} 0.5(110) \\ 55^\circ \end{array}$$

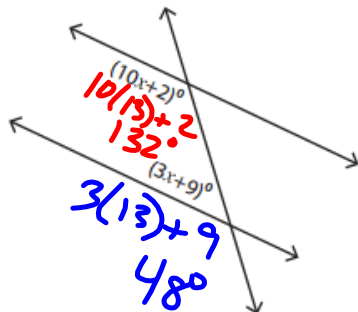
6.

Geometry Fact: Alternate Interior \angle 's

Equation:

$$\begin{array}{r}
 \cancel{4x} + 11 = \cancel{5x} - 10 \\
 -4x \qquad -4x \\
 \hline
 11 - x = 10 \\
 +10 \qquad +10 \\
 \hline
 21 = x
 \end{array}$$

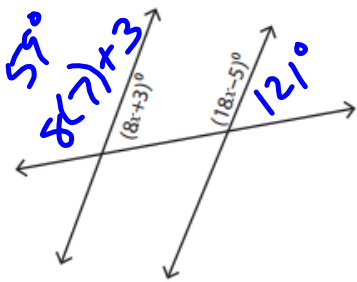
7.

Geometry Fact: Supplementary \angle 's

Equation:

$$\begin{array}{r}
 10x + 2 + 3x + 9 = 180 \\
 \underbrace{10x + 2 + 3x + 9}_{13x + 11} = 180 \\
 \cancel{13x} + 11 = 180 \\
 -11 \qquad -11 \\
 \hline
 13x = 169 \\
 \cancel{13} \qquad \cancel{13} \\
 \hline
 x = 13
 \end{array}$$

8.

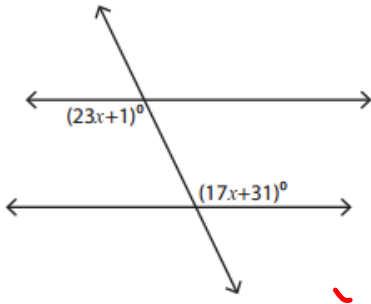


Geometry Fact: **Supplementary \angle 's**

Equation:

$$\begin{aligned}
 8x+3 + 18x-5 &= 180 \\
 26x-2 &= 180 \\
 +2 & \quad +2 \\
 \hline
 26x &= 182 \\
 \frac{26}{26} & \quad \frac{26}{26} \\
 \hline
 x &= 7
 \end{aligned}$$

9.

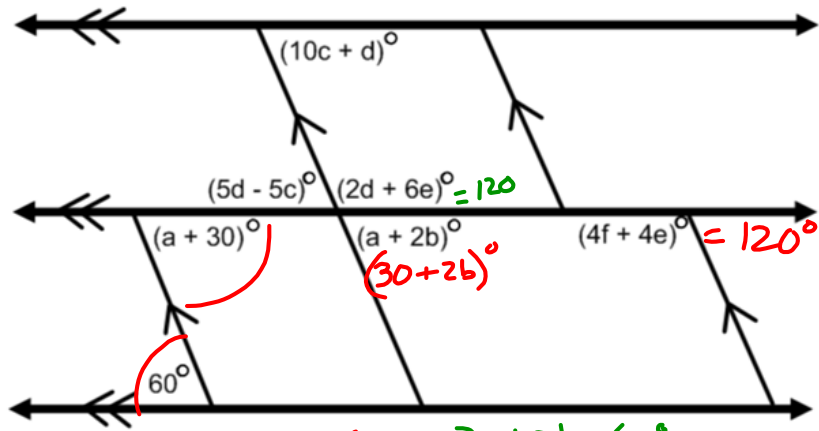


Geometry Fact: **Alt. Interior \angle 's**

Equation:

$$17x+31 = 23x+1$$

Challenge



$$\begin{array}{r} a + 30 = 60 \\ -30 \quad -30 \\ \hline a = 30 \end{array}$$

$$\begin{array}{r} 30 + 2b = 60 \\ -30 \quad -30 \\ \hline 2b = 30 \\ \frac{2b}{2} = \frac{30}{2} \\ b = 15 \end{array}$$

$$5d - 5c = 60$$

$$\begin{array}{r} 5(d - c) = 60 \\ \frac{5(d - c)}{5} = \frac{60}{5} \\ d - c = 12 \end{array}$$

$$\begin{array}{r} d - c = 12 \\ +c \quad +c \\ \hline d = 12 + c \end{array}$$

$$\begin{array}{r} d = 12 + 4 \frac{4}{11} \\ d = 16 \frac{4}{11} \end{array}$$

$$10c + d = 60$$

$$10c + (12 + c) = 60$$

$$10c + 12 + c = 60$$

$$11c + 12 = 60$$

$$\begin{array}{r} 11c + 12 = 60 \\ -12 \quad -12 \\ \hline 11c = 48 \end{array}$$

$$c = 4 \frac{4}{11}$$

$$2d + 6e = 120$$

$$2(16 \frac{4}{11}) + 6e = 120$$

$$e = 14 \frac{6}{11}$$

$$4f + 4e = 120$$

$$4f + 4(14 \frac{6}{11}) = 120$$

$$\begin{array}{r} 4f + 58 \frac{24}{11} = 120 \\ -58 \frac{24}{11} \quad -58 \frac{24}{11} \\ \hline 4f = 61 \frac{9}{11} \end{array}$$

$$\begin{array}{r} 4f = 61 \frac{9}{11} \\ \frac{4f}{4} = \frac{61 \frac{9}{11}}{4} \end{array}$$

$$f = 15 \frac{5}{11}$$