Geometry Unit 3: Transversals

Bronx Early College Academy

Christopher J. Huson PhD

11 October - 21 October 2022

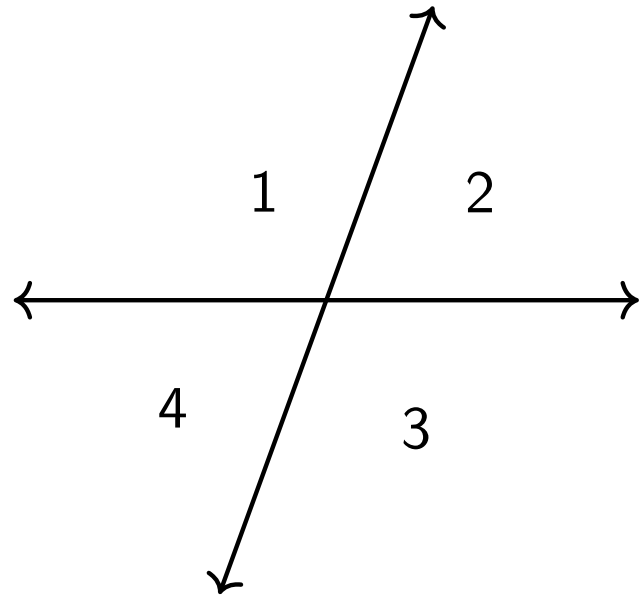
3.1 Identify transversal angles	11 October
3.2 Transversals problems	12 October
3.3 Triangle sum theorem	13 October
3.4 Parallelograms	14 October
3.5 External angles	17 October
3.6 Transversal situations	18 October
3.7 Parallelogram situations	19 October
3.8 Transversals review	20 October
3.9 Transversals test	21 October

Learning Target: I can name parallel lines transversal angles

HSG.CO.C.9 Prove theorems about lines and angles 3.1 Tuesday 11 October

Do Now: Identify the true statements

1. $\angle 1 \cong \angle 2$
2. $\angle 2 \cong \angle 4$
3. $m\angle 1 + m\angle 4 = 180^\circ$
4. $m\angle 2 + m\angle 3 = 90^\circ$

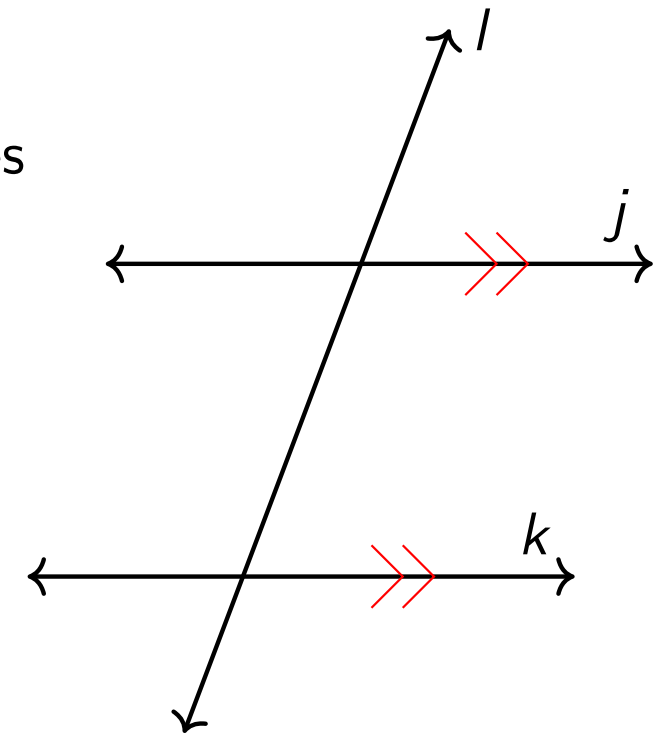


Lesson: Parallel lines crossed by a transverse line, horizontal and vertical directions

New terminology for parallel lines

Parallel lines are in the same plane and never intersect

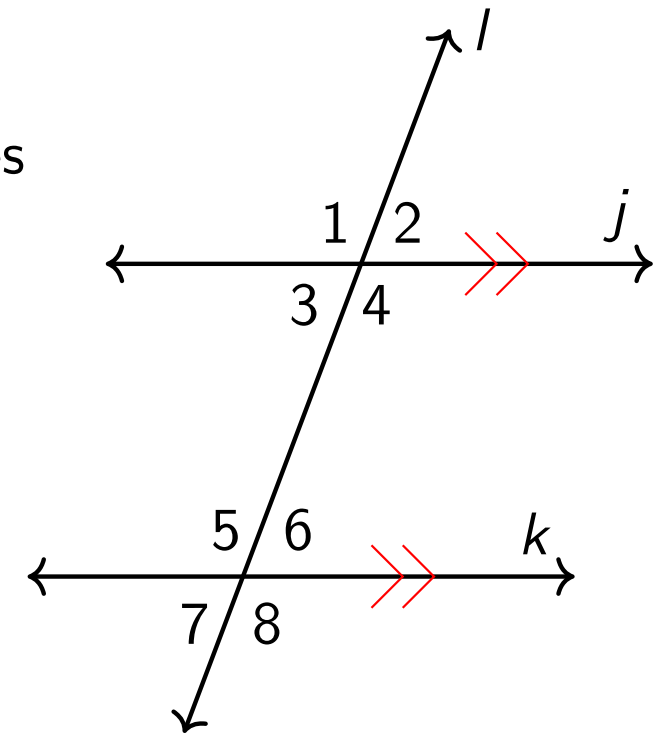
Parallel lines	$j \parallel k$, mark with arrows
Transversal	Line l, crosses parallel lines
Interior	Inside ($\angle$s)
Exterior	Outside ($\angle$s)
Same-side	On the left or right of l
Alternate	Across l from each other
Horizontal	Sideways direction
Vertical	Up and down direction



New terminology for parallel lines

Parallel lines are in the same plane and never intersect

Parallel lines	$j \parallel k$, mark with arrows
Transversal	Line l, crosses parallel lines
Interior	Inside ($\angle$s)
Exterior	Outside ($\angle$s)
Same-side	On the left or right of l
Alternate	Across l from each other
Horizontal	Sideways direction
Vertical	Up and down direction



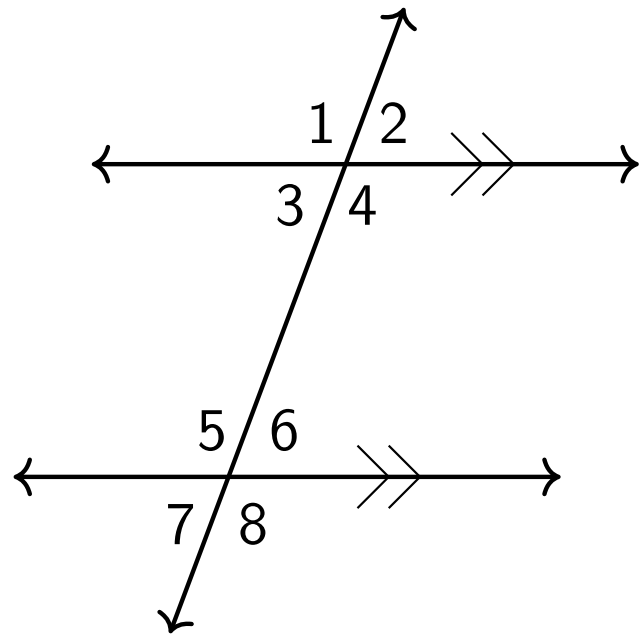
We often number the angles this way.

New theorems for parallel lines

Corresponding Having the same position. e.g. $\angle 2$ and $\angle 6$

Postulate Corresponding $\angle$s of $\parallel$ lines are congruent, $\angle 2 \cong \angle 6$

1. Alternate interior $\angle$s are $\cong$
   $\angle 4 \cong \angle 5$
2. Same-side interior $\angle$s are supplementary
   $m\angle 3 + m\angle 5 = 180$
3. Alternate exterior $\angle$s are $\cong$
   $\angle 1 \cong \angle 8$

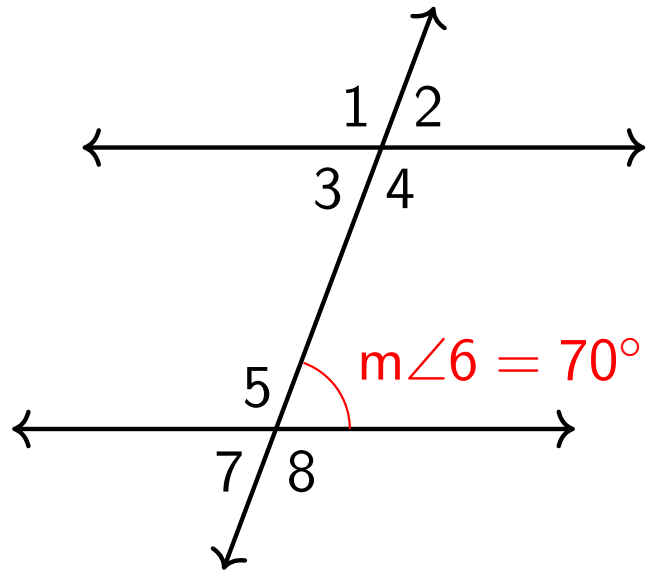


There are only two angle measures, the acute $\angle$s and the obtuse $\angle$s
And they add to 180°, i.e. supplementary

Apply the theorems of parallel lines with a transversal

Given two parallel lines and a transversal, with $m\angle 6 = 70°$. Write down the value of each angle measure.

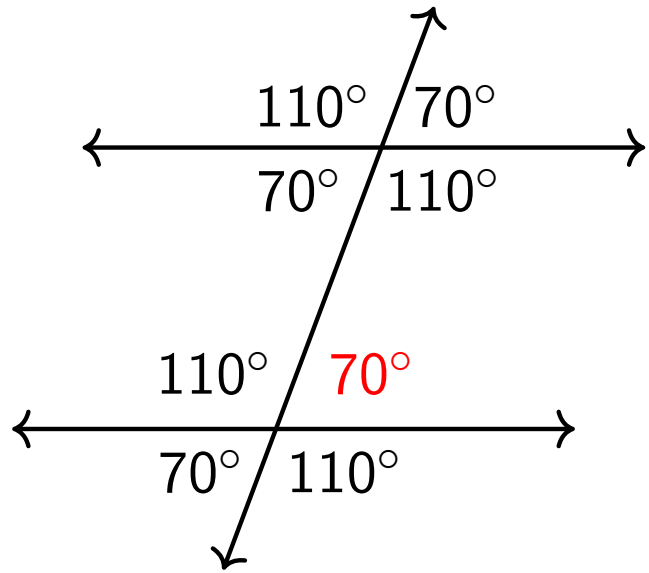
1. $m\angle 1 =$
2. $m\angle 2 =$
3. $m\angle 3 =$
4. $m\angle 4 =$
5. $m\angle 5 =$
6. $m\angle 6 = 70°$
7. $m\angle 7 =$
8. $m\angle 8 =$



Apply the theorems of parallel lines with a transversal

Given two parallel lines and a transversal, with $m\angle 6 = 70°$. Write down the value of each angle measure.

1. $m\angle 1 =$
2. $m\angle 2 =$
3. $m\angle 3 =$
4. $m\angle 4 =$
5. $m\angle 5 =$
6. $m\angle 6 = 70°$
7. $m\angle 7 =$
8. $m\angle 8 =$



Solution

Extension: Ratios are fractions

We often state proportions as ratios

Example: Divide a distance into equal parts, i.e.

$$1 : 1$$

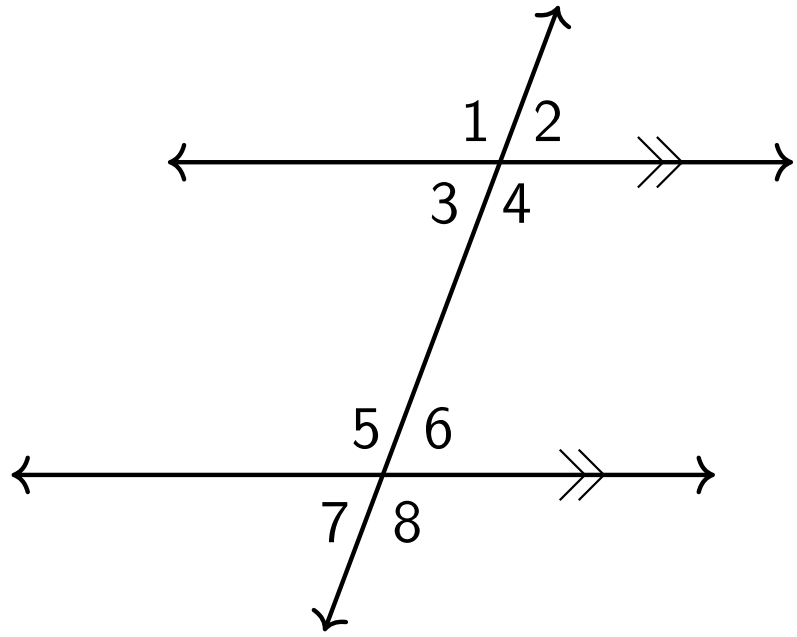
We say "one to one", or "in a one to one ratio."
A rectangle's length to width ratio is two to one. $2 : 1$

Learning Target: I can calculate transversal angles

HSG.CO.C.9 Prove theorems about lines and angles 3.2 Wednesday 12 October

Do Now: Identify each angle

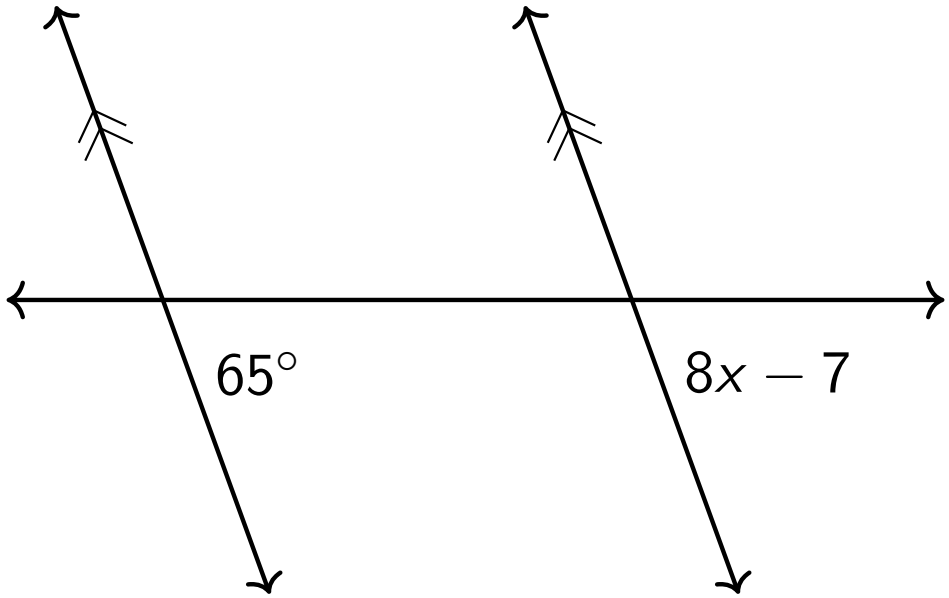
1. Opposite $\angle 4$
2. Corresponding to $\angle 3$
3. Alternate exterior to $\angle 8$
4. Same side interior to $\angle 5$
5. Alternate interior to $\angle 4$



Lesson: Triangle sum theorem

Parallel lines intersected by a transversal. Find x.

Parallel lines do not have to be horizontal.



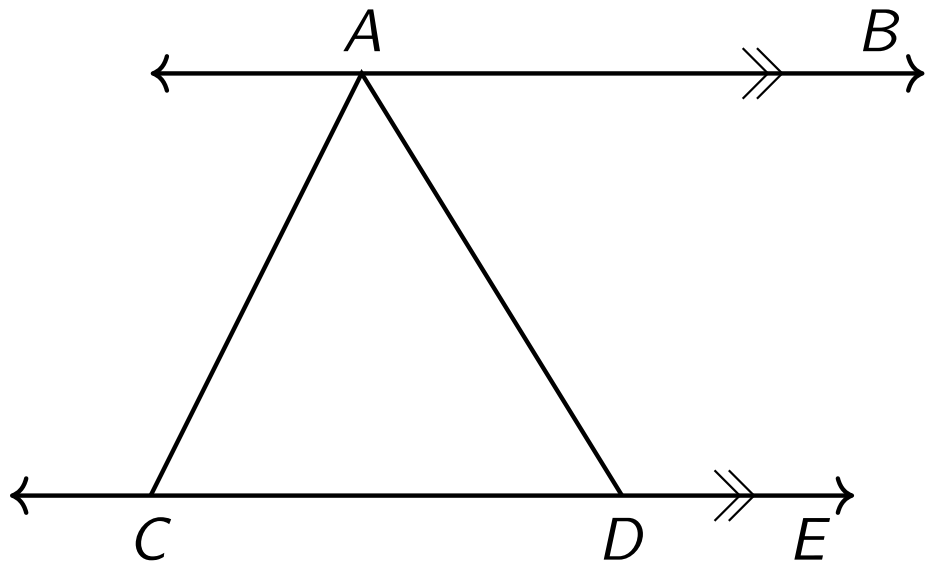
State the postulate or theorem you are employing.

Learning Target: I can calculate triangle angles

HSG.CO.C.9 Prove theorems about lines and angles 3.3 Thursday 13 October

Lesson: Sum of a triangle's interior angles is 180°

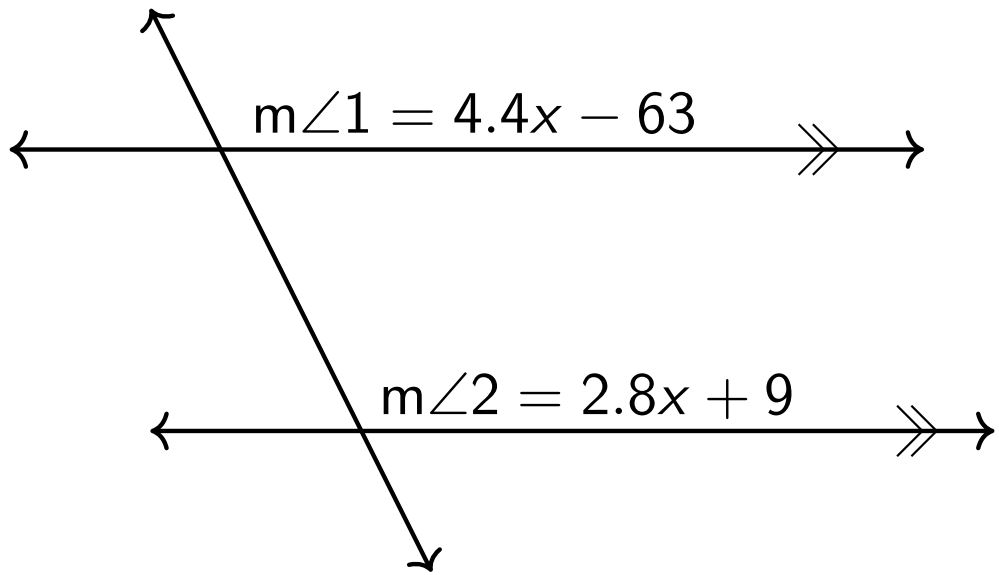
Given parallel lines $\overleftrightarrow{AB} \parallel \overleftrightarrow{CDE}$ with $\overline{AC} \cong \overline{CD}$. If $m\angle BAD = 80$ find $m\angle ACD$.



Learning Target: I can define a parallelogram

HSG.CO.C.9 Prove theorems about lines and angles 3.4 Friday 14 October

Two parallel lines intersect a transversal. Given corresponding angles $m\angle 1 = 4.4x - 63$ and $m\angle 2 = 2.8x + 9$, find the measure of $\angle 1$.

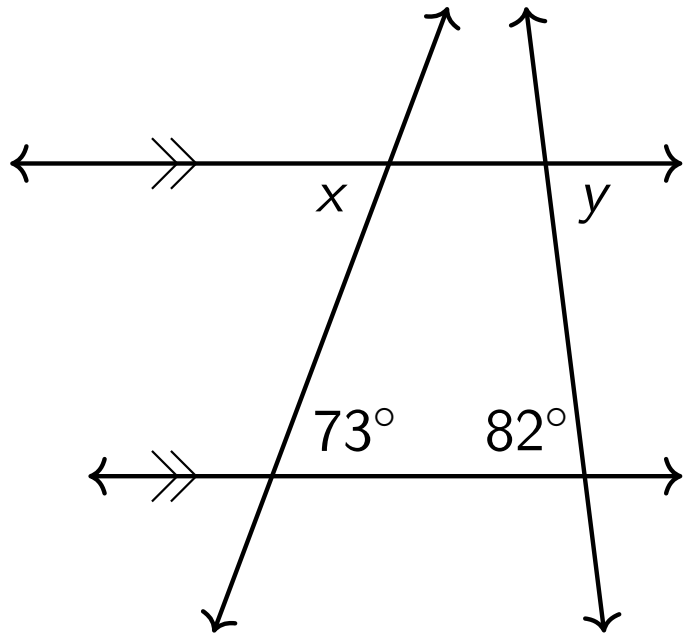


Learning Target: I can calculate external triangle angles

HSG.CO.C.9 Prove theorems about lines and angles 3.5 Monday 17 October

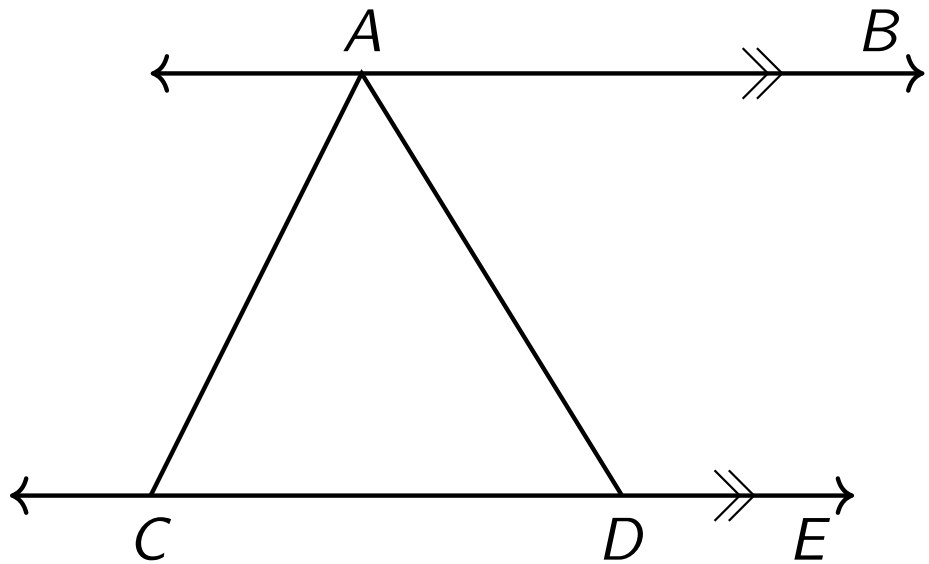
Do Now:

1. Given two parallel lines, two transversals
2. Find x, y
3. What relationship are you using? (e.g. vertical angles, same-side exterior angles, alternate interior angles, etc.)



Lesson: Triangle external angle theorem

Given parallel lines $\overleftrightarrow{AB} \parallel \overleftrightarrow{CDE}$ with $\overline{AC} \cong \overline{CD}$. If $m\angle BAD = 80$ find $m\angle ACD$.



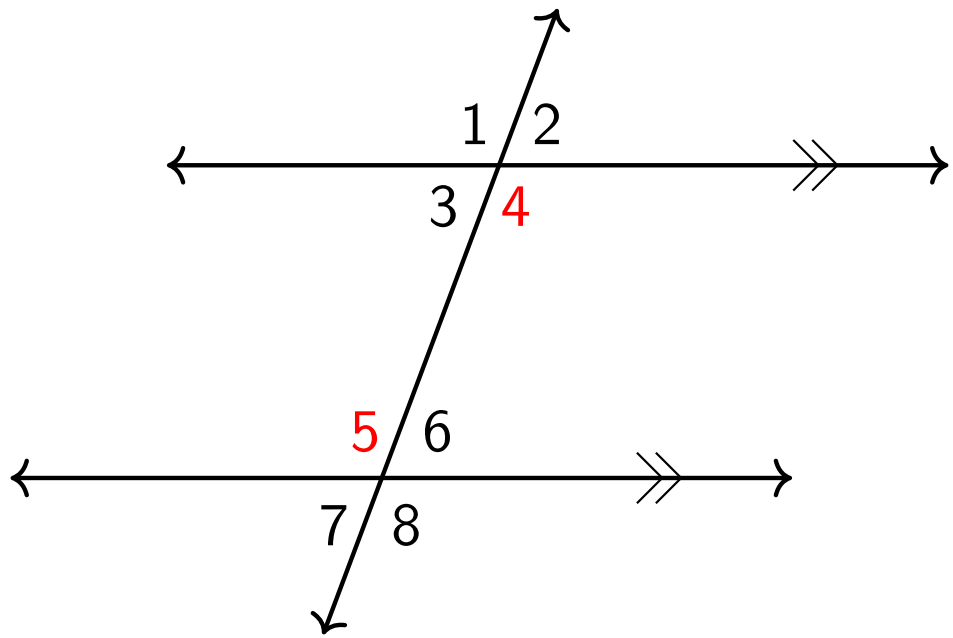
Learning Target: I can calculate transversal angles

HSG.CO.C.9 Prove theorems about lines and angles 3.6 Tuesday 18 October

Given two parallel lines and a transversal,

$m\angle 4 = 3x$ and $m\angle 5 = x + 70$.

Write an equation, then solve for x.

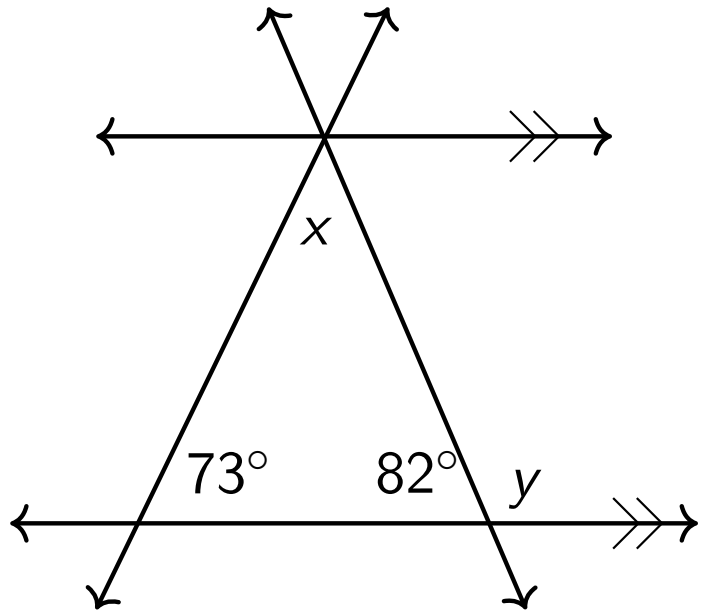


Learning Target: I can calculate angles in parallelograms

HSG.CO.C.9 Prove theorems about lines and angles 3.7 Wednesday 19 October

Do Now:

1. Given a triangle, shown
2. Find angle measures x, y
3. What relationships are you using? (e.g. vertical angles, same-side exterior angles, alternate interior angles)

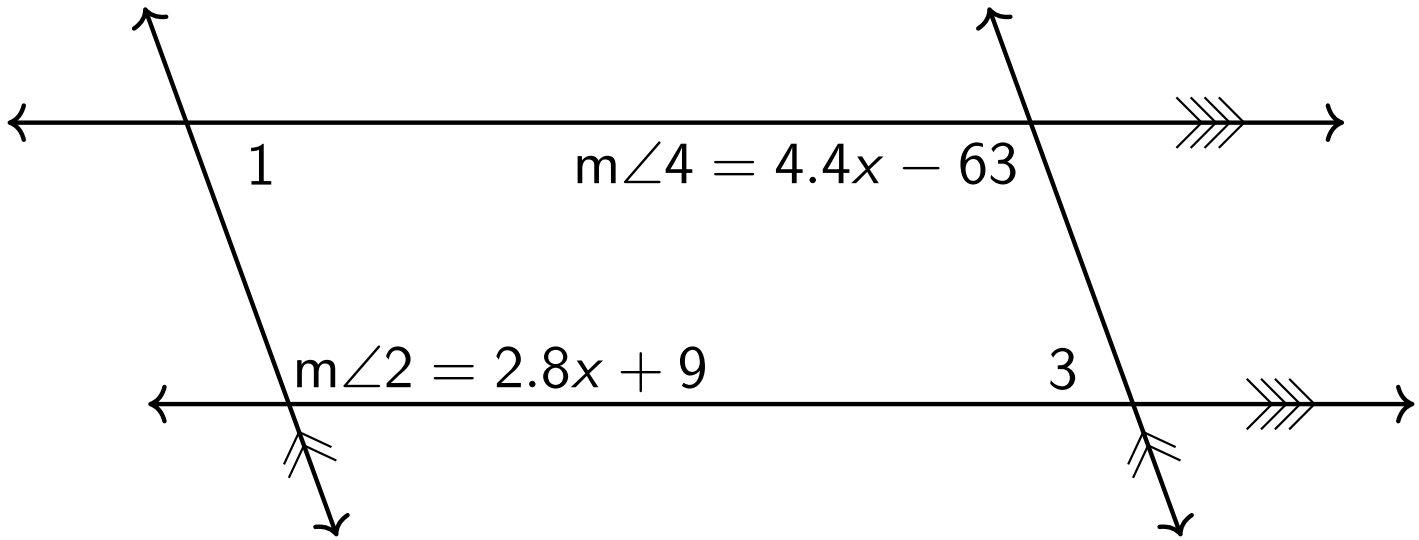


Lesson: Triangle's exterior angles

Learning Target: I can review with my classmates

HSG.CO.C.9 Prove theorems about lines and angles 3.8 Thursday 20 October

Two parallel lines intersect a second set of parallel lines. Given $m\angle 2 = 2.8x + 9$ and $m\angle 4 = 4.4x - 63$, find the measure of $\angle 1$.



Learning Target: I can review with my classmates

HSG.CO.C.9 Prove theorems about lines and angles 3.9 Friday 21 October