Mathematics Class Slides

Bronx Early College Academy

Christopher J. Huson PhD

21-25 September 2020

1.1 1st day of Geometry, Segment addition, 21 Sept

1.2 Segment addition, midpoint, 23 Sept

1.3 Number line situations, 24 Sept

1.4 Isosceles triangles, 29 Sept

1.5 Vocabulary and compass use, 1 October

1.6 Review segment calculations, 2 October

GQ: How do we define the basic elements of geometry?

CCSS: HSG.CO.A.1 Know precise geometric definitions 1.1 Monday 21-22 Sept

Welcome back to school

Do Now: Algebra skills check

1. Remote learning attendance
2. Take out notebooks (or blank paper)
3. Complete Do Now on Google Classroom

Supply list: Composition book, folder, looseleaf, pencils & pens, compass and ruler, calculator
Lesson: Points, line segments, length; Segment addition postulate
Homework: Begin Khan Academy unit (due Friday)

Take class notes in a composition book

Use this notebook format (required)

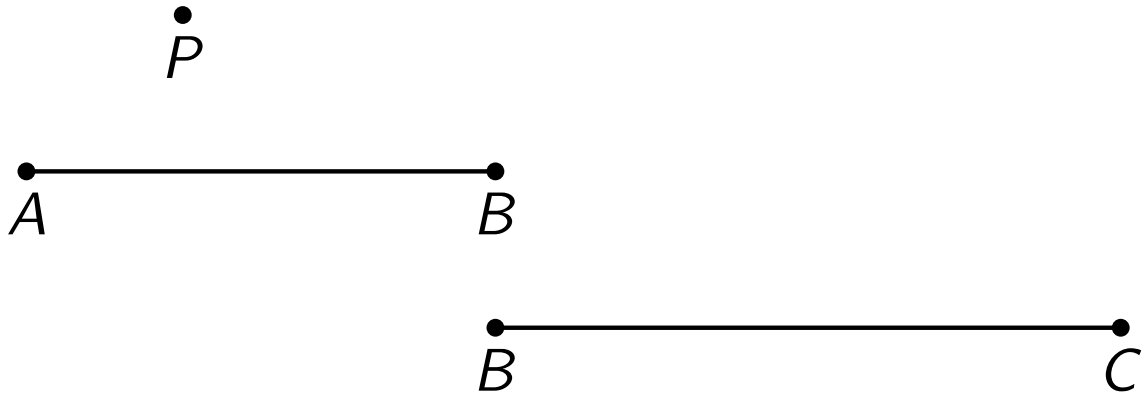
1. In the front, write your name, my contact info, your passwords
2. Each page in the top left corner:
   First+Last Name
   21 September 2020
   1.1 Segment addition postulate
3. Copy definitions using your own words
4. Write down example diagrams and problems

Point: a location, a dot, has no size; label with capital letter, P

Line segment: two points and all the points between them; label with *end points* and a bar, $\overline{AB}$

Example: Points and line segments

Shown points P, A, B, C, line segments $\overline{AB}$, $\overline{BC}$



Given $AB = 3$, $BC = 4$.

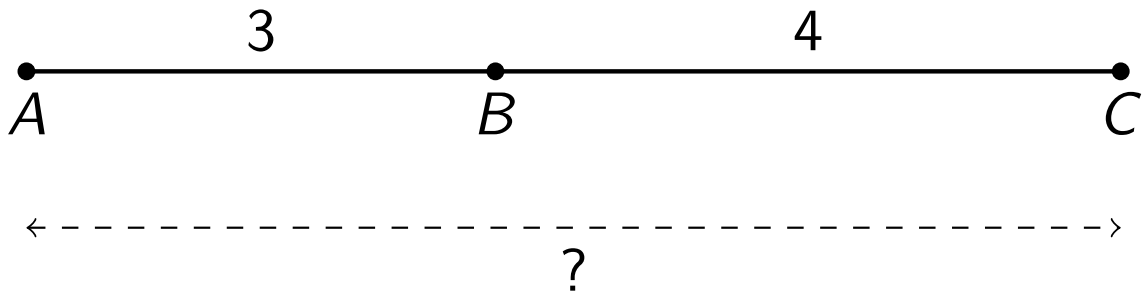
Notation: the length of a line segment is written as the two end points without a bar over them, AB.

Example: Points and line segments

Segment Addition Postulate

Shown *collinear* points A, B, C. Given $AB = 3$, $BC = 4$.

Find AC.



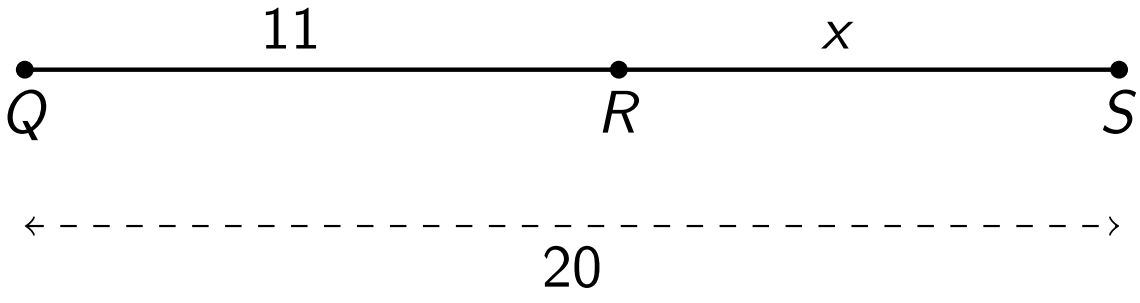
Definition: Points are *collinear* when they lie on a straight line.

Example 2: Points and line segments

Segment Addition Postulate

Given collinear points Q, R, S, with $QR = 11$, $QS = 20$.

Find RS.

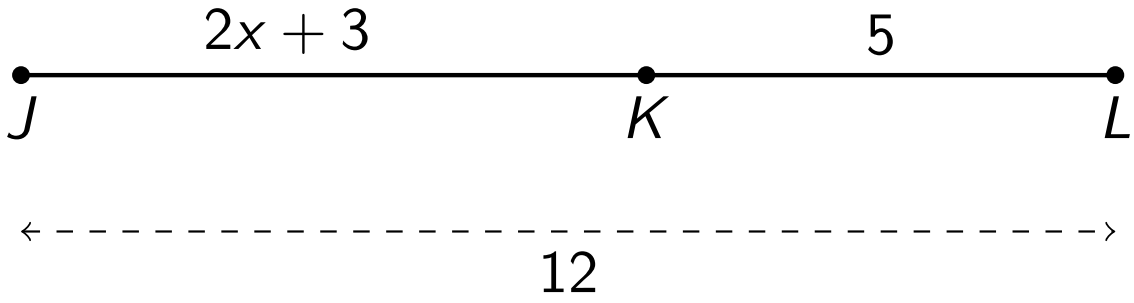


1. How would you check your answer?
2. Which equation represents the situation?

$11 + x = 20$ $\qquad\qquad$ $x = 20 - 11$

Example 3: Segment addition postulate

Given $\overline{JKL}$, $JK = 2x + 3$, $KL = 5$, $JL = 12$. Find x.



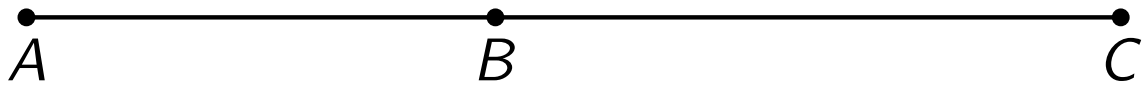
1. Write down an equation to represent the situation.

2. Solve for x.

3. Check your answer.

Example 4 (challenge): Segment addition postulate

Given $\overline{ABC}$, $AB = 3x - 7$, $BC = x + 5$, $AC = 14$. Find AB.



GQ: How do we solve for segment lengths?

CCSS: HSG.CO.A.1 Know precise geometric definitions 1.2 Wedn 23-24 Sept

Do Now: Complete Google Form in G-Classroom

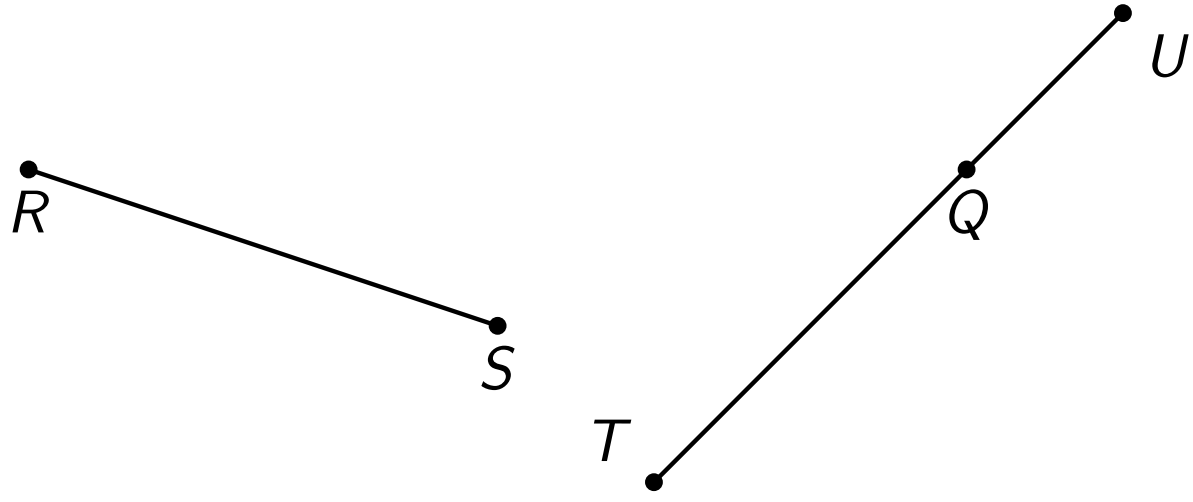
Lesson:
Point, line segment, end point, collinear, distance or length;
line, ray, plane, coplanar, congruent, angle, vertex

Midpoints, bisectors, practice segment addition situations

Review: points, segments, length

Give an example of each geometric object. Use proper notation.

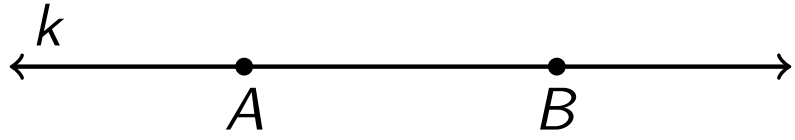
1. point
2. line segment
3. end point
4. three collinear points



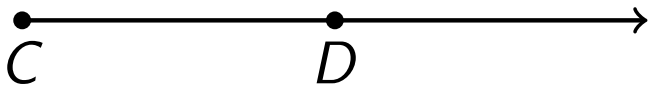
5. Given $TQ = 1.4$, $QU = 0.6$. Find TU.

More definitions: lines, rays, planes

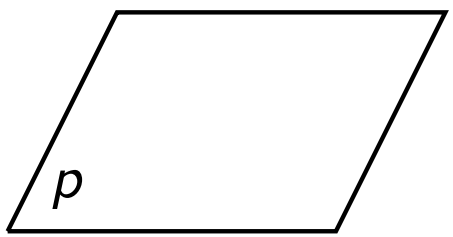
A *line* extends infinitely in both directions, $\overleftrightarrow{AB}$.
(sometimes labeled with a small letter, for example, line k)



A *ray* has one end point and extends infinitely in one direction, $\overrightarrow{CD}$.

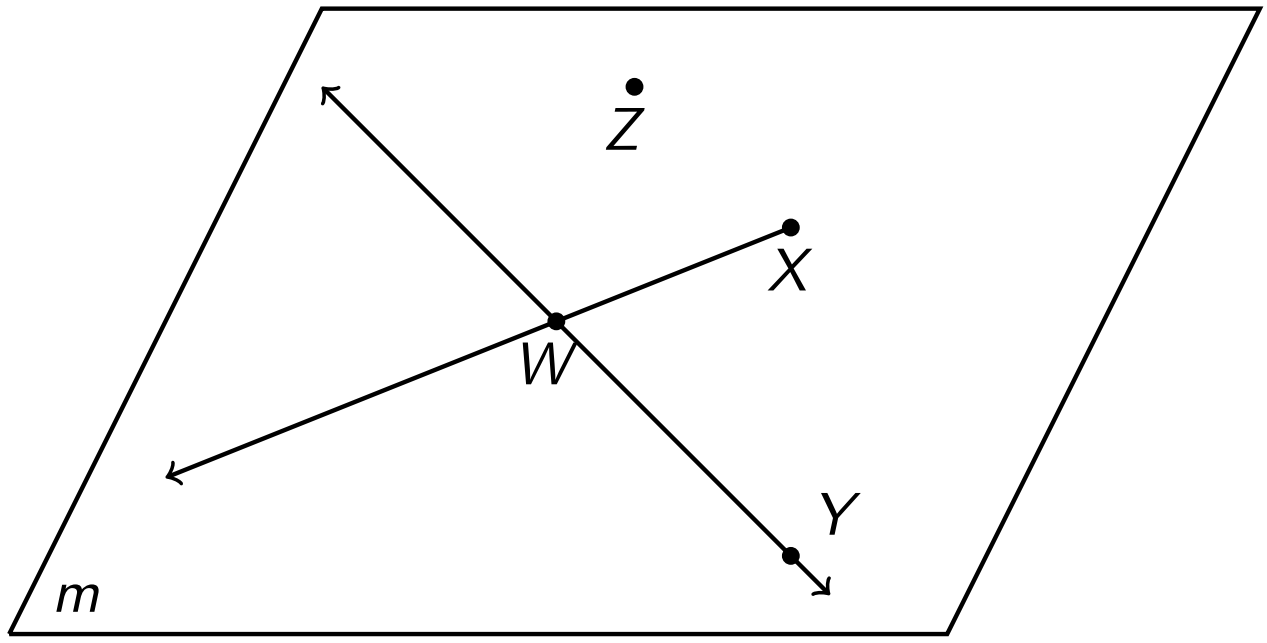


A *plane* is flat and extends infinitely in two directions, p.



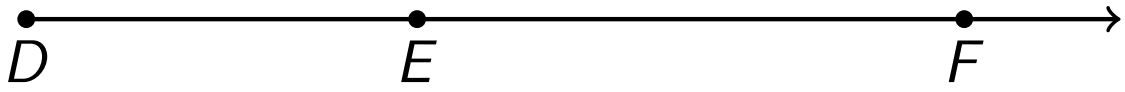
Several objects are shown in a plane

1. T F The name of the plane is m
2. T F The line $\overleftrightarrow{WY}$ is in the plane
3. T F The ray $\overrightarrow{WX}$ is shown in the plane
4. T F Points W, X, and Z are collinear



Solve for length using the Segment Addition postulate

Given $\overrightarrow{DEF}$, $DE = x + 1$, $EF = 9$, $DF = 3x$. Find DE.



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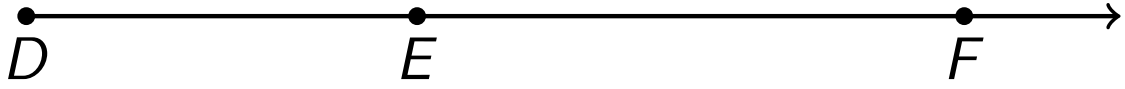


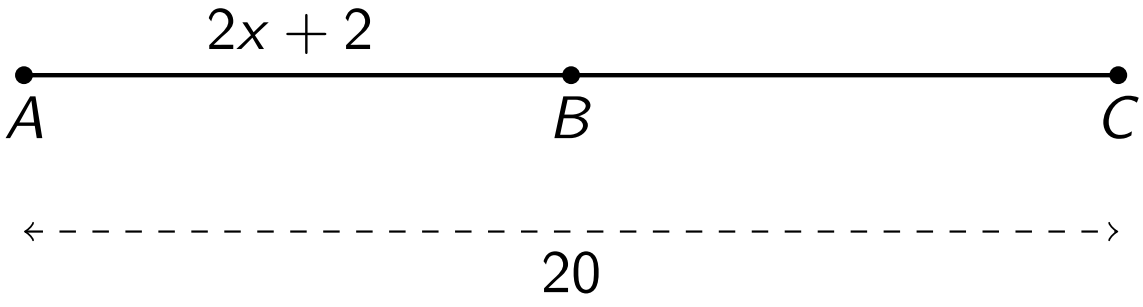
1. Sketch and label the situation
2. Write a geometric equation
3. Substitute algebraic values
4. Solve for x
5. Answer the question
6. Check your answer

The midpoint of a line segment

Also called the bisector

Given $\overline{ABC}$, with $AB = 2x + 2$, $AC = 20$. $AB = BC$

Find x.



Definition: the *midpoint* or *bisector* of a line segment divides it exactly in half.

GQ: How do we work on a number line?

CCSS: HSG.CO.A.1 Know precise geometric definitions 1.3 Thurs 24-25 Sept

Do Now: Complete Google Form in G-Classroom

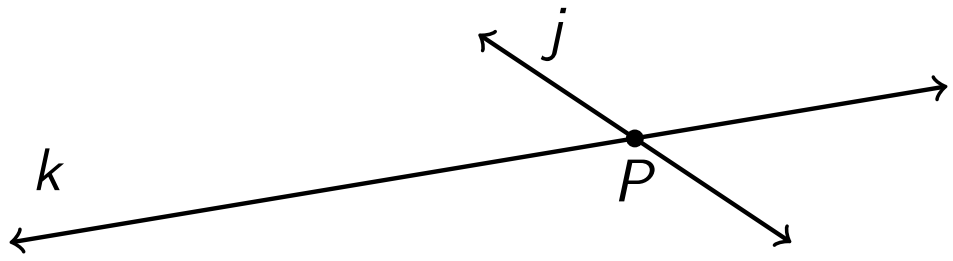
Lesson: *Congruent* line segments;
sketch, draw, construct; intersection, coplanar

Practice midpoints and segment addition situations

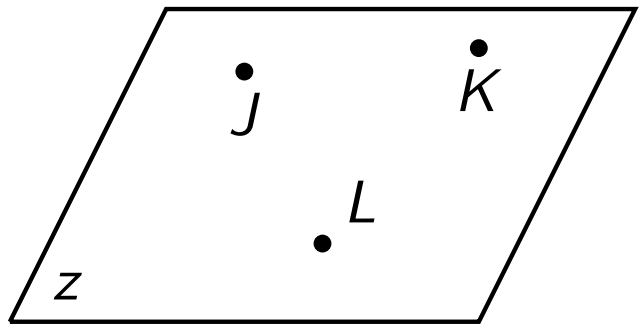
Homework reminder: Khan Academy, watch the videos first, take notes

More definitions: intersections, coplanar

Two lines *intersect* if they cross. Their common point is the *intersection*. (shown here, lines j and k intersect at point P)



Coplanar means to lie in the same plane. Three points are always coplanar, but four points may not be.



Formal meanings of sketch, draw, and construct

1. *Sketch* is to make a freehand diagram of important features.

   Use a pencil to write carefully in your notebook or on paper.

2. *Draw* is to depict with accurate measures using ruler, protractor, and compass.

   For example, draw a diagram of your room.

3. *Construct* is a formal, logical process to create geometric figures using only a straightedge and compass.

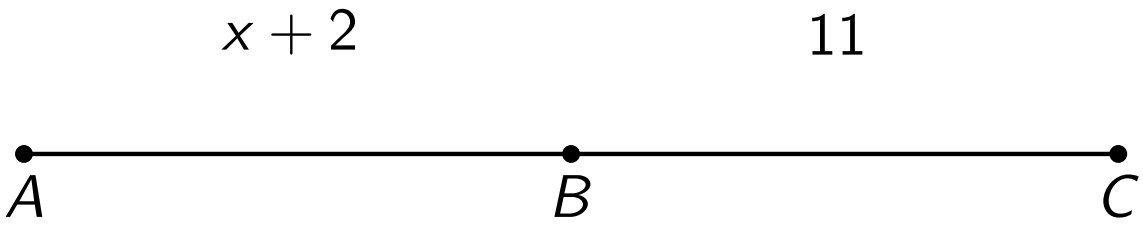
4. Drawn to *scale* means that all of the lengths are proportional. (e.g. a "scale model")

   Tests will often warn that diagrams are "not drawn to scale"

A bisector creates two line segments with the same length

Congruent line segments are the same length

Given point B is the midpoint of $\overline{AC}$, with $AB = x + 2$, $BC = 11$.
Find x.

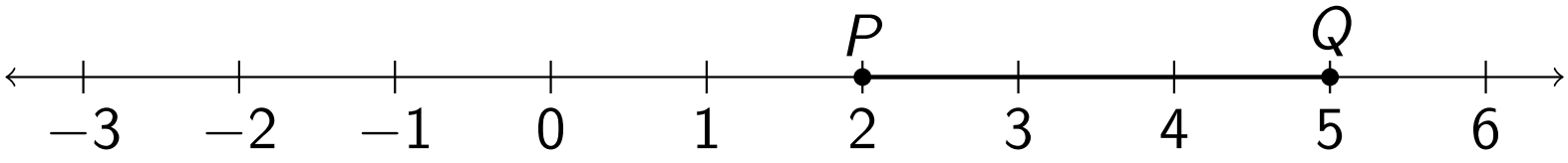


Definition: *Congruent* means equal in length. $\overline{AB} \cong \overline{BC}$
We mark congruent segments in diagrams with cross hatch marks.

A number line is useful for calculating length or distance

Take the difference in the points' values

Given $\overline{PQ}$ as shown on the number line.

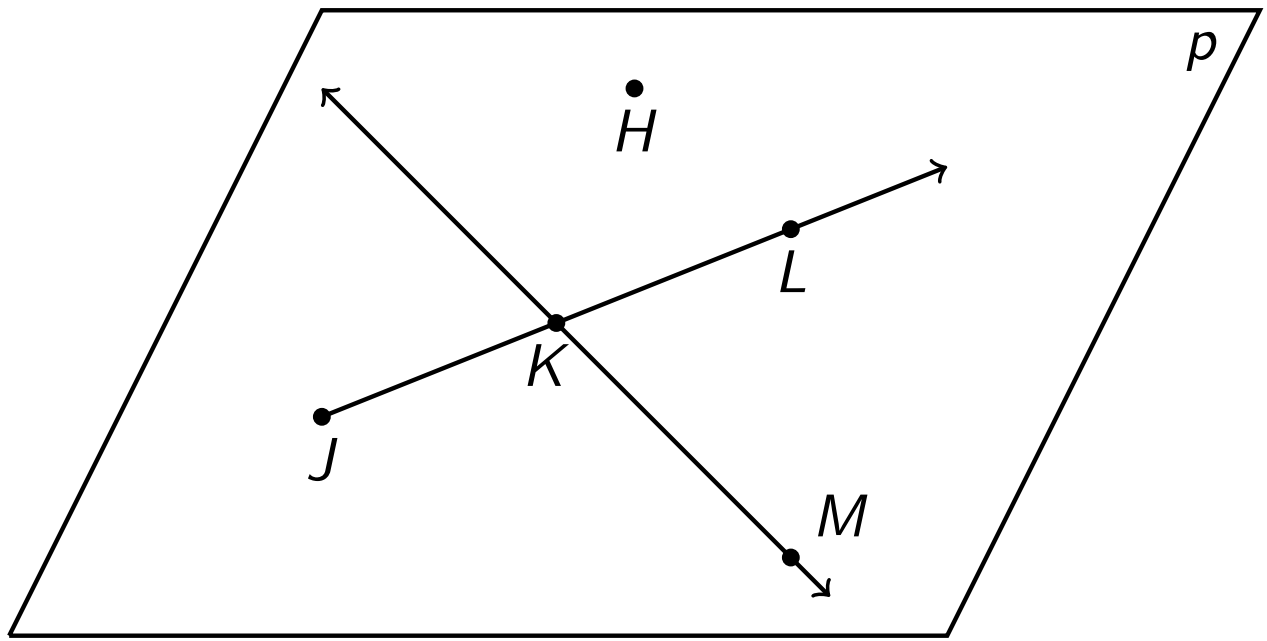


What is the distance on the number line between the points P and Q?

Getting to know Classkick

Complete each item. Use the Classkick tool bar.

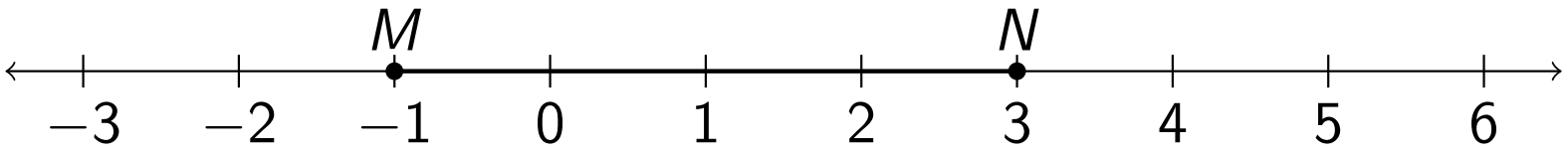
1. Circle the point H with a red pen
2. Use the highlighter tool to mark in yellow the ray $\overrightarrow{JL}$
3. Type your name in this box in blue



Negative number practice on a number line

Take the difference in the points' values. Check by counting the marks.

Given $\overline{MN}$ with $M(-1)$ and $N(3)$, as shown on the number line.



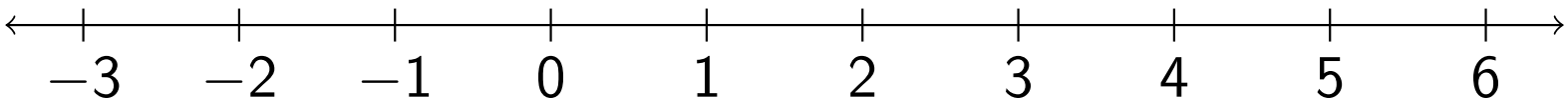
What is the length of the segment $\overline{MN}$? Show your work as an equation.

Can a length be a negative number?

Decimal practice on a number line

Mark the points then take the difference in the points' values.

Given $\overline{GH}$ with $G(1)$ and $H(4.5)$.



1. Mark and label the points and segment on the number line.
2. What is the length of the segment $\overline{GH}$? Show your work as an equation.

GQ: How do we work with congruent segments?

CCSS: HSG.CO.A.1 Know precise geometric definitions 1.4 Monday 29-30 Sept

Do Now: Complete Google Form in G-Classroom

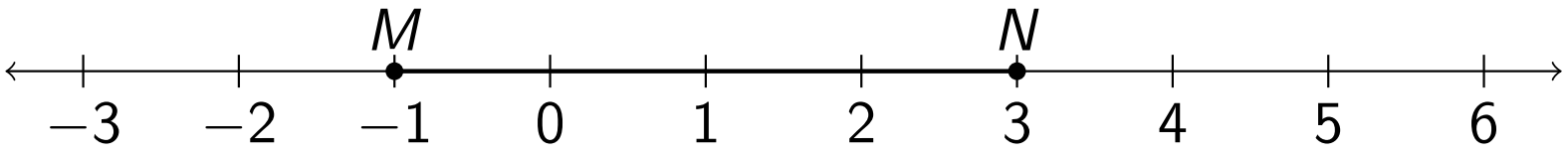
Lesson: Perimeter, congruent line segments in rectangles & isosceles triangles

Classwork: Deltamath perimeter assignment

Negative number practice on a number line

Take the difference in the points' values. Check by counting the marks.

Given $\overline{MN}$ with $M(-1)$ and $N(3)$, as shown on the number line.



What is the length of the segment $\overline{MN}$? Show your work as an equation.

Can a length be a negative number?

GQ: How do we construct an equilateral triangle?

CCSS: HSG.CO.A.1 Know precise geometric definitions 1.5 Thursday 1 Oct

Welcome to in-person classes

Lesson: Compass use, introduction to constructions

Homework: Vocabulary worksheet practice

GQ: How do we measure line segments?

CCSS: HSG.CO.A.1 Know precise geometric definitions 1.6 Friday 2 Oct

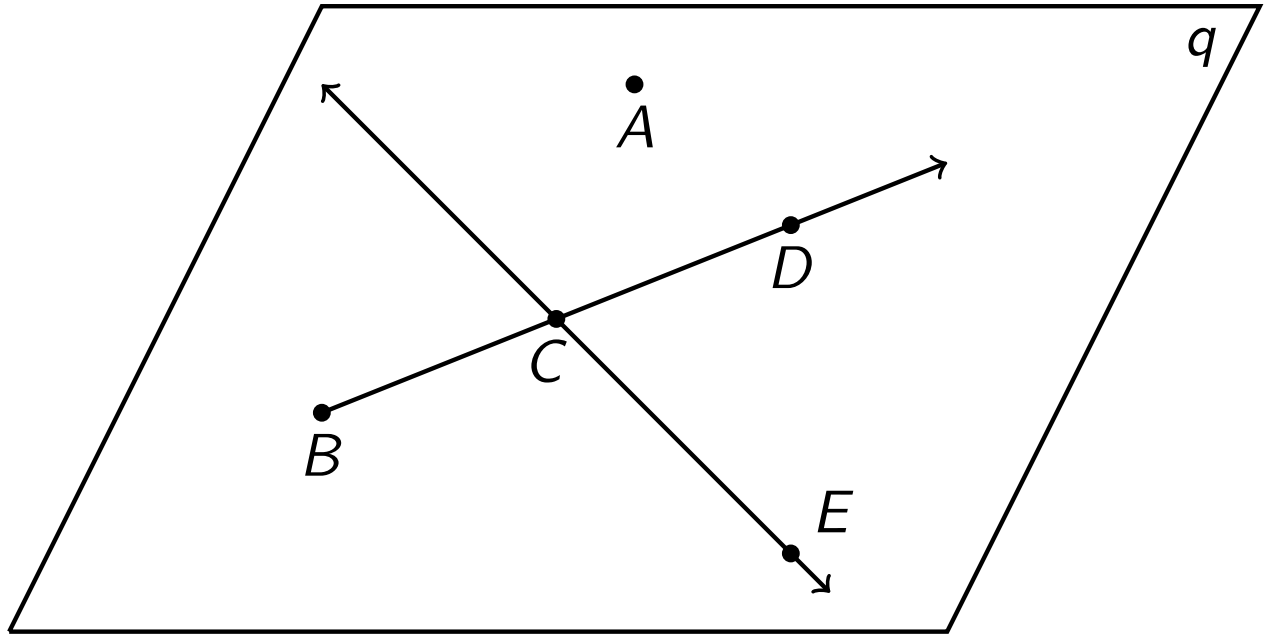
Do Now: complete assessments questions

1. How do we work efficiently and be a good scholar
2. What should we know and be able to do

Lesson: Review and practice of line segments and congruence

1) Complete each item. Use the Classkick tool bar.

1. Circle the point A with a blue pen
2. Use the highlighter tool to mark in yellow the ray $\overrightarrow{BD}$
3. Type the name of the plane in red here $\rightarrow$



2) Sketch an isosceles triangle

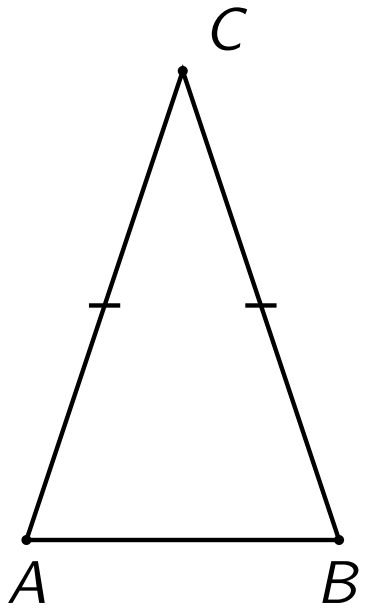
Mark the congruent sides with tick marks.

3) Draw a ray. (careful! which direction does it go?)

Given the points X and Y, draw $\overrightarrow{YX}$.

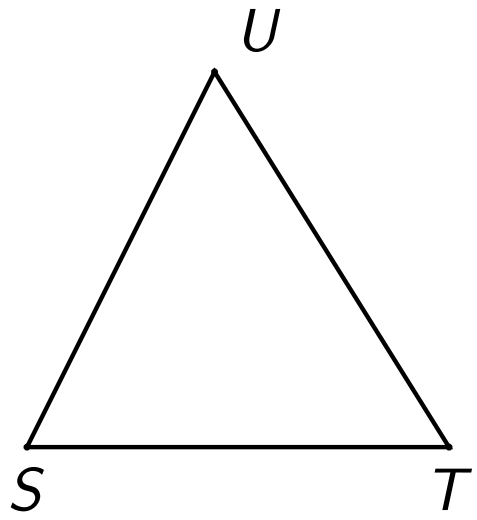
4) Use proper notation (including the bar over the letters)

Given $\triangle ABC$ write down two congruent line segments using proper notation.



5) On the diagram mark the congruent line segments with tick marks.

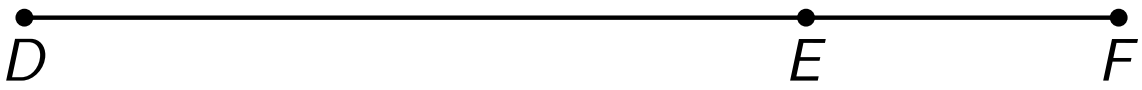
Given $\triangle STU$ with $\overline{ST} \cong \overline{TU}$.



6) Apply the Segment Addition Postulate

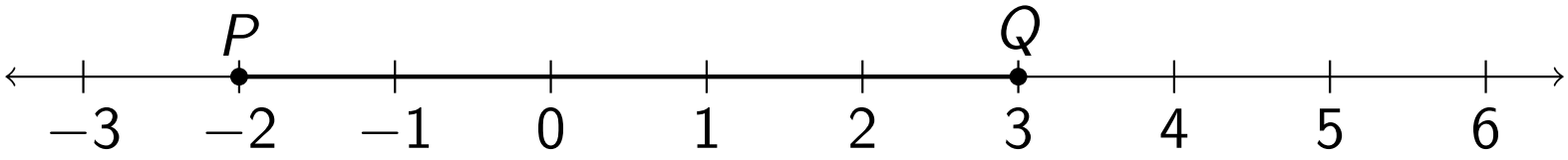
Show your work by marking the diagram and writing an equation.

Given $\overline{DEF}$, $DE = 8.5$, and $EF = 2.5$. Find DF.



7) Find the length of the line segment $\overline{PQ}$.

Given $P(-2)$ and $Q(3)$, as shown on the number line.

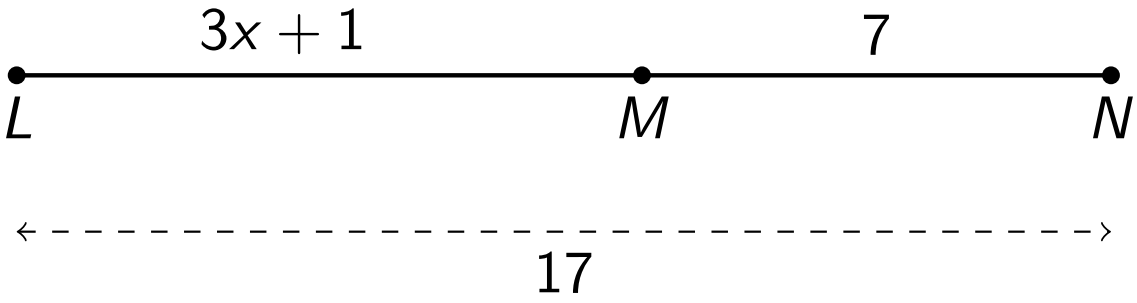


State an equation and the solution.

Check your work by counting the distance. Leave marks to show your work.

8) Solve for x using the segment addition postulate

Given $\overline{LMN}$, $LM = 3x + 1$, $MN = 7$, $LN = 17$. Find x.



1. Write down an equation to represent the situation.

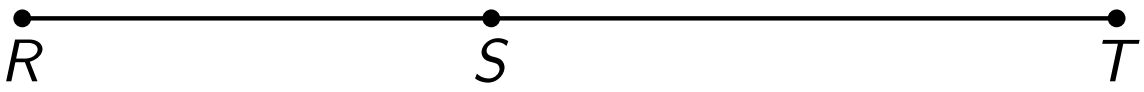
2. Solve for x.

3. Check your answer.

9) Solve for x given a bisector

Given M is the midpoint of $\overline{AB}$, $AM = 5x + 2$, $MB = 20$.

1. Mark the diagram with the values and tick marks
2. Write an equation and solve for x
3. Check your result

10) Mark the diagram and state your answer as a fraction

Given $\overline{RST}$, $RS = 3\frac{2}{3}$, and $RT = 9\frac{1}{3}$. Find ST.