Mathematics Class Slides

Bronx Early College Academy

Christopher J. Huson PhD

13-22 September 2021

1.1 1st day of Geometry, Segment addition, 13-14 Sept

1.3 Segment addition, midpoint, 17 Sept

1.4 Number line situations, 20 Sept

1.5 Midpoint calculations; Isosceles triangles, 21 Sept

1.6 Angles and their measures, 22 September

Learning Target: I can measure and diagram my world

CCSS: HSG.CO.A.1 Know precise geometric definitions 1.1 Tuesday 13-14 Sept

Welcome back to school

Do Now: Measurement

1. Notebook first page: Name / Course / Instructor
2. Diagram people closest to you and their distance
3. Early finishers: Calculate diagonal distances

Supply list: Composition book, looseleaf, pencils & pens, compass and ruler, calculator; Optional: folder

Lesson: Points, line segments, length; Segment addition postulate

Homework: Diagram your bedroom (with measurements), or another room

Take class notes in a composition book

Use this notebook format (required)

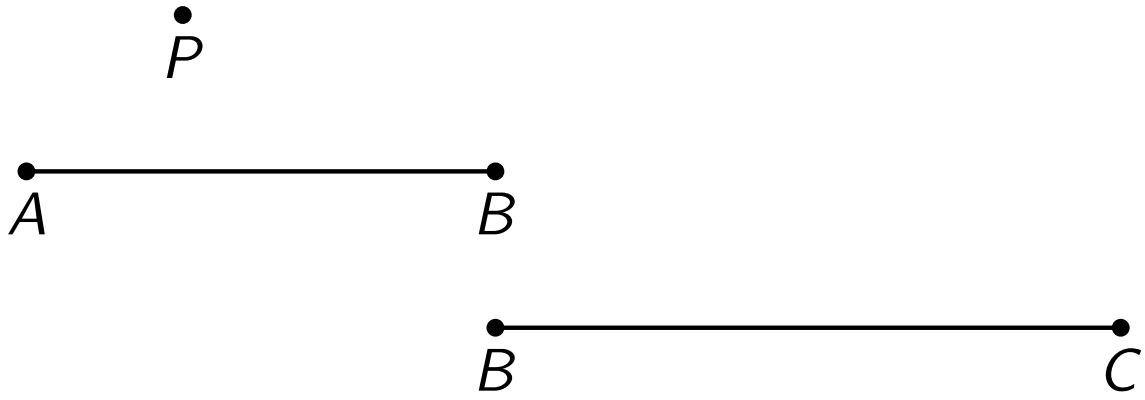
1. In the front, write your name, my contact info, your passwords
2. Each page in the top left corner:
   First+Last Name
   14 September 2021
   Learning Target: I can measure and diagram my world
3. Copy definitions using your own words
4. Write down example diagrams and problems

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

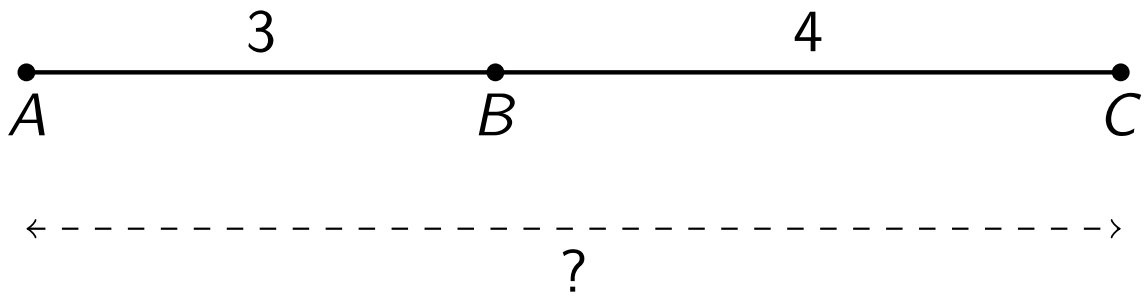
Notation: the length of a line segment is written as the two end points without a bar over them, AB.

Example: Points and line segments

Segment Addition Postulate

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

Find AC.



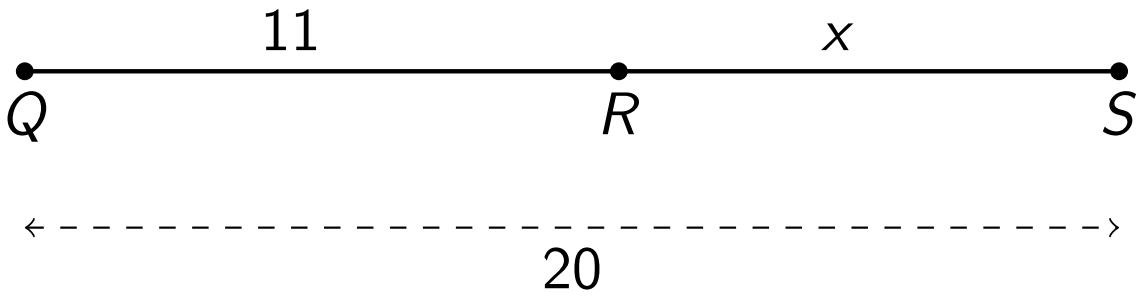
Definition: Points are *collinear* when they lie on a straight line.

Example 2: Points and line segments

Segment Addition Postulate

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

Find RS.

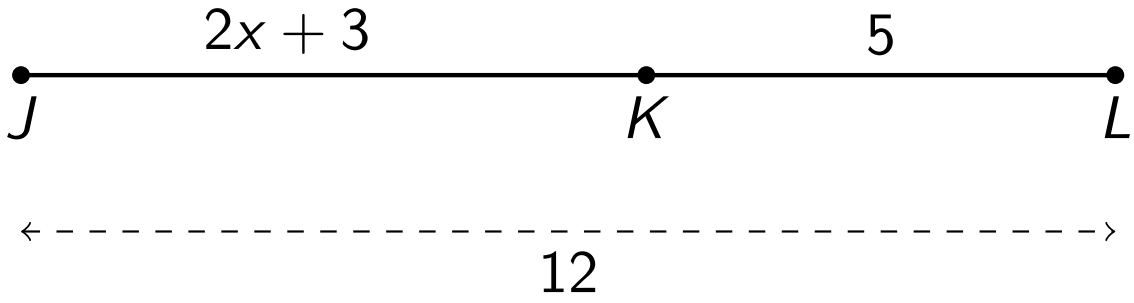


1. How would you check your answer?
2. Which equation represents the situation?

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

Example 3: Segment addition postulate

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



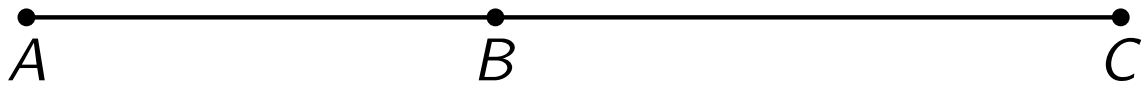
1. Write down an equation to represent the situation.

2. Solve for x.

3. Check your answer.

Example 4 (challenge): Segment addition postulate

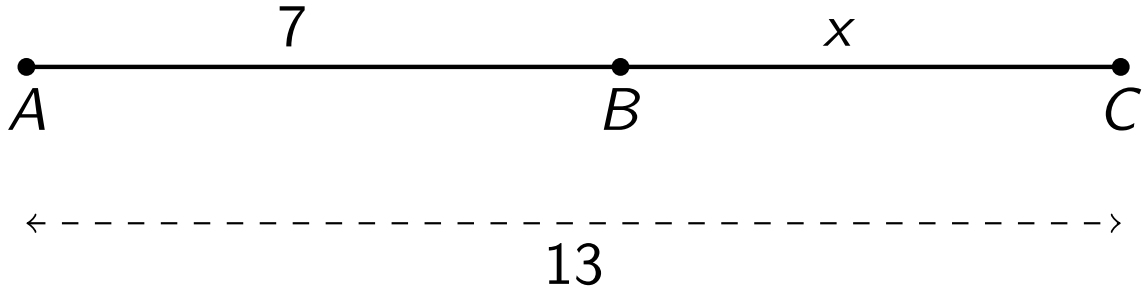
Given $\overline{ABC}$, $AB = 3x - 7$, $BC = x + 5$, $AC = 14$. Find AB.



Learning Target: I can solve for segment lengths

CCSS: HSG.CO.A.1 Know precise geometric definitions 1.3 Friday 17 Sept

Do Now: Given collinear points A, B, C, with $AB = 7$, $AC = 13$.



1. Which equation most simply represents the situation?

   $7 + x = 13$ $\qquad\qquad$ $x = 13 - 7$

2. Find BC.

Classwork: Handout (pre-quiz for 6th period)

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

Midpoints, bisectors, practice segment addition situations

Casio fx-9750GII calculator - due Friday 1 October

In the high school at BECA we use the Casio fx-9750GII.

It is allowed on the Regents exams, SAT tests, and International Baccalaureate exams.

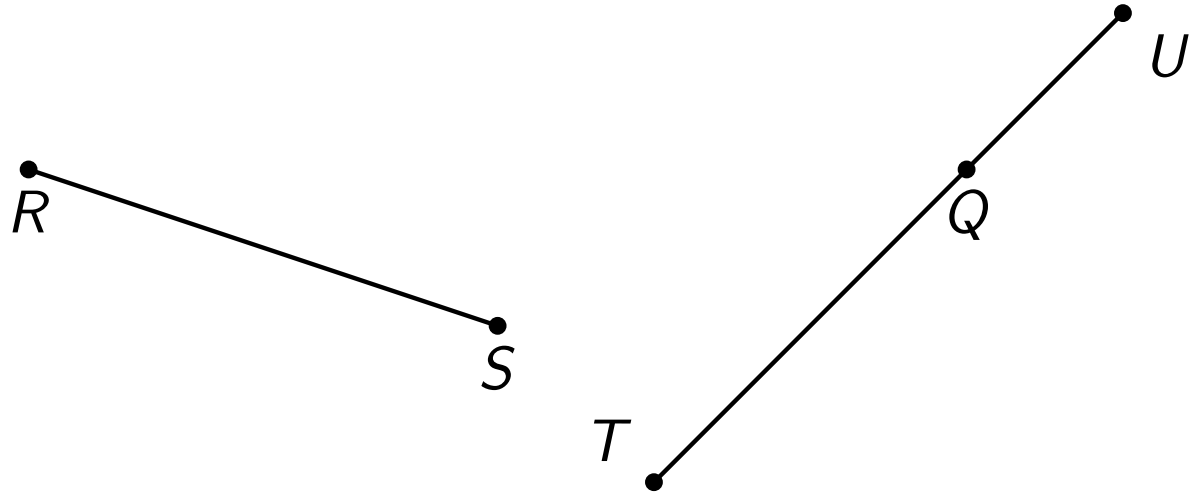
You may use a different calculator in Geometry if you prefer, but I recommend buying the Casio fx-9750GII.

(see me if buying a calculator is a hardship for your family)

Review: points, segments, length

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

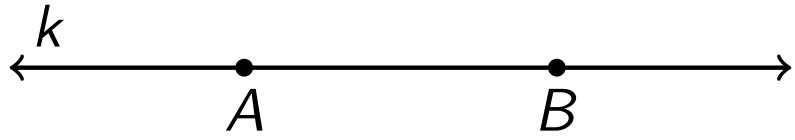
1. point
2. line segment
3. end point
4. three collinear points



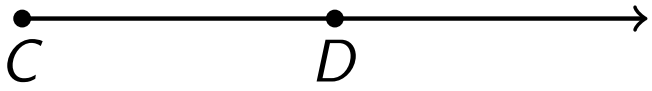
5. Given $TQ = 1.4$, $QU = 0.6$. Find TU.

More definitions: lines, rays, planes

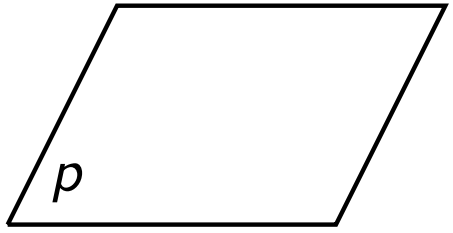
A *line* extends infinitely in both directions, $\overleftrightarrow{AB}$.
(sometimes labeled with a small letter, for example, line k)



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

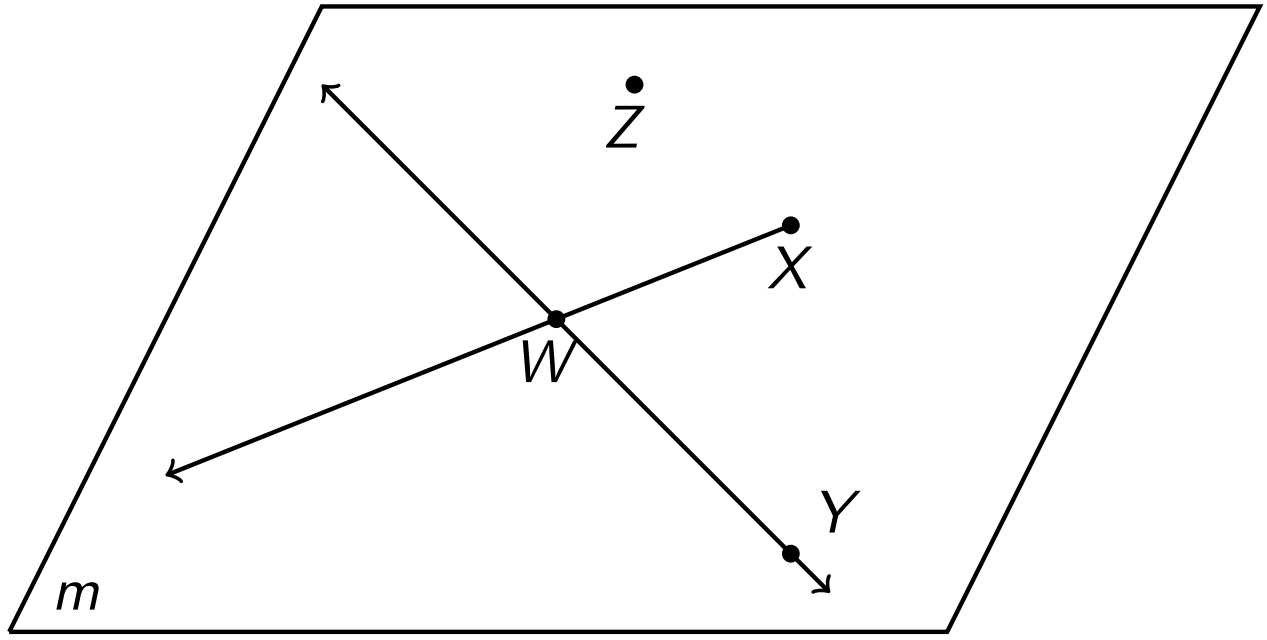


A *plane* is flat and extends infinitely in two directions, p.



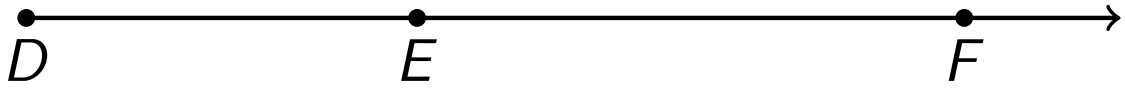
Several objects are shown in a plane

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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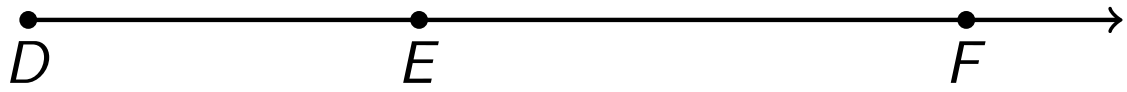


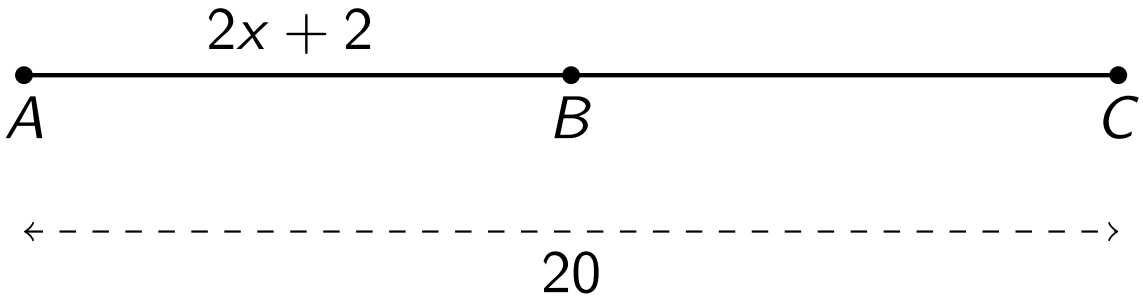
1. Sketch and label the situation
2. Write a geometric equation
3. Substitute algebraic values
4. Solve for x
5. Answer the question
6. Check your answer

The midpoint of a line segment

Also called the bisector

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

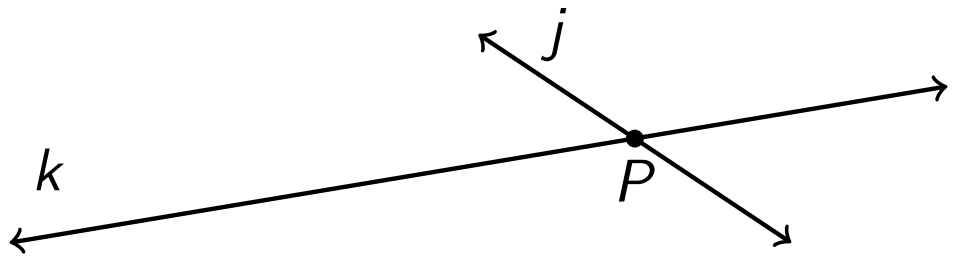
Find x.



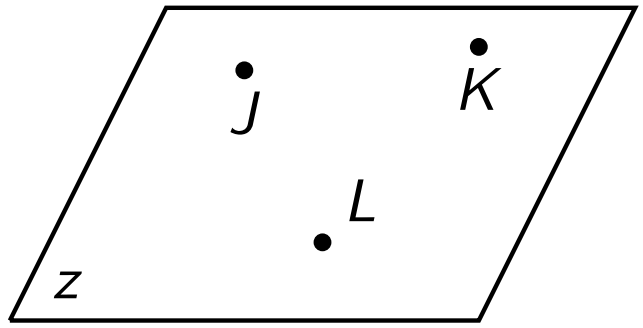
Definition: the *midpoint* or *bisector* of a line segment divides it exactly in half.

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.

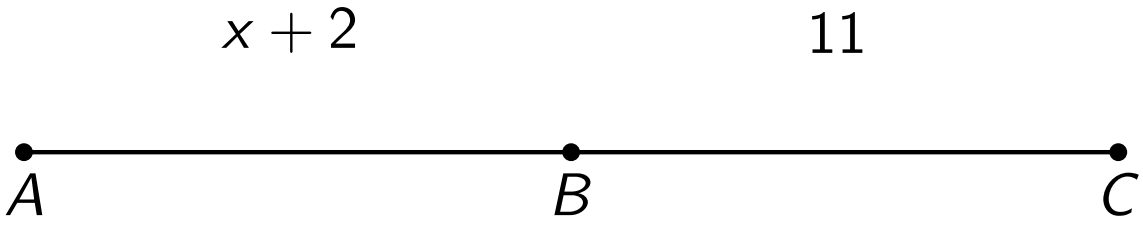


Learning Target: I can work with a number line

CCSS: HSG.CO.A.1 Know precise geometric definitions 1.4 Monday 20 Sept

Do Now: Midpoint calculations

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



1.3 Segments scores in Jumprope. Make up if absent

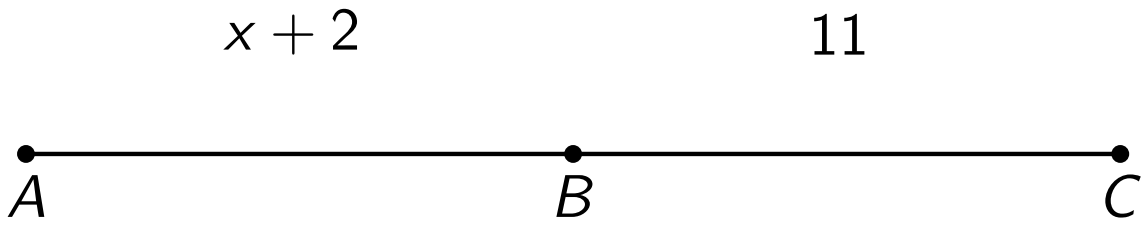
Lesson: Number lines, distance and length, absolute value

Practice midpoints and segment addition situations

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.

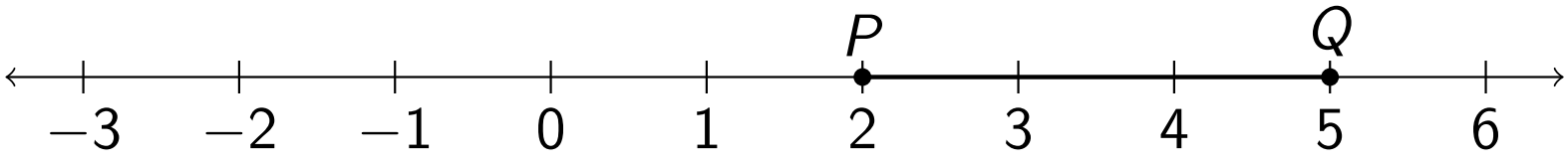


Definition: *Congruent* means equal in length. $\overline{AB} \cong \overline{BC}$
We mark congruent segments in diagrams with cross hatch marks.

A number line is useful for calculating length or distance

Take the difference in the points' values

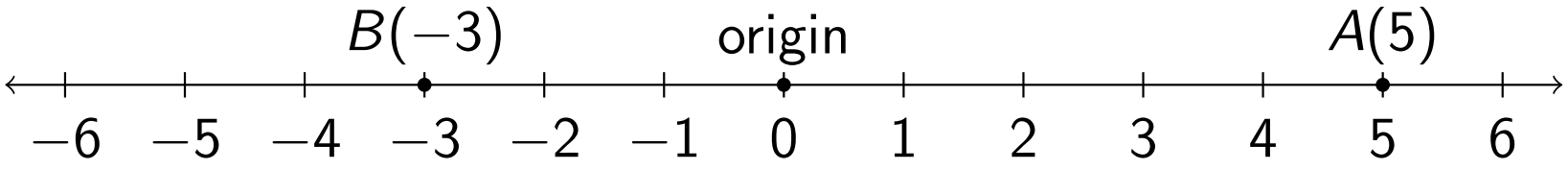
Given $\overline{PQ}$ as shown on the number line.



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

Absolute value: the distance from a point to the origin

Always a positive number (or zero)



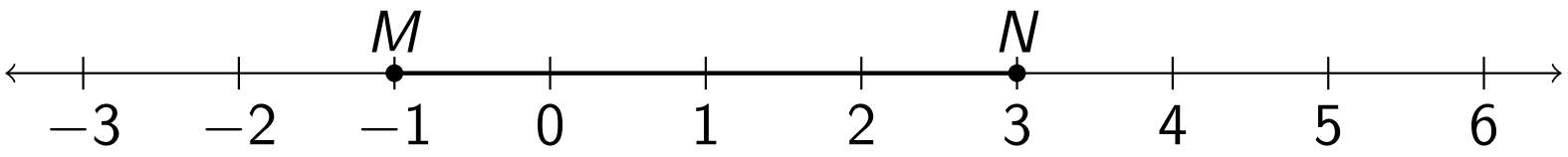
The absolute value of 5 is 5. $|5| = 5$

The absolute value of -3 is 3. $|-3| = 3$

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.



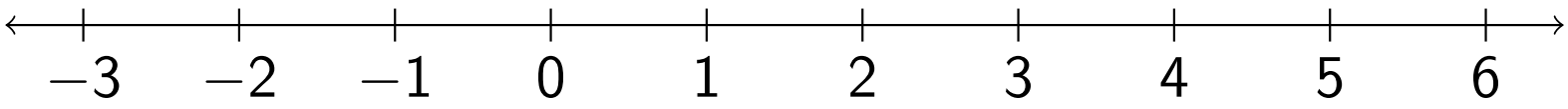
What is the length of the segment $\overline{MN}$? Show your work as an equation.

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 $H(4.5)$.

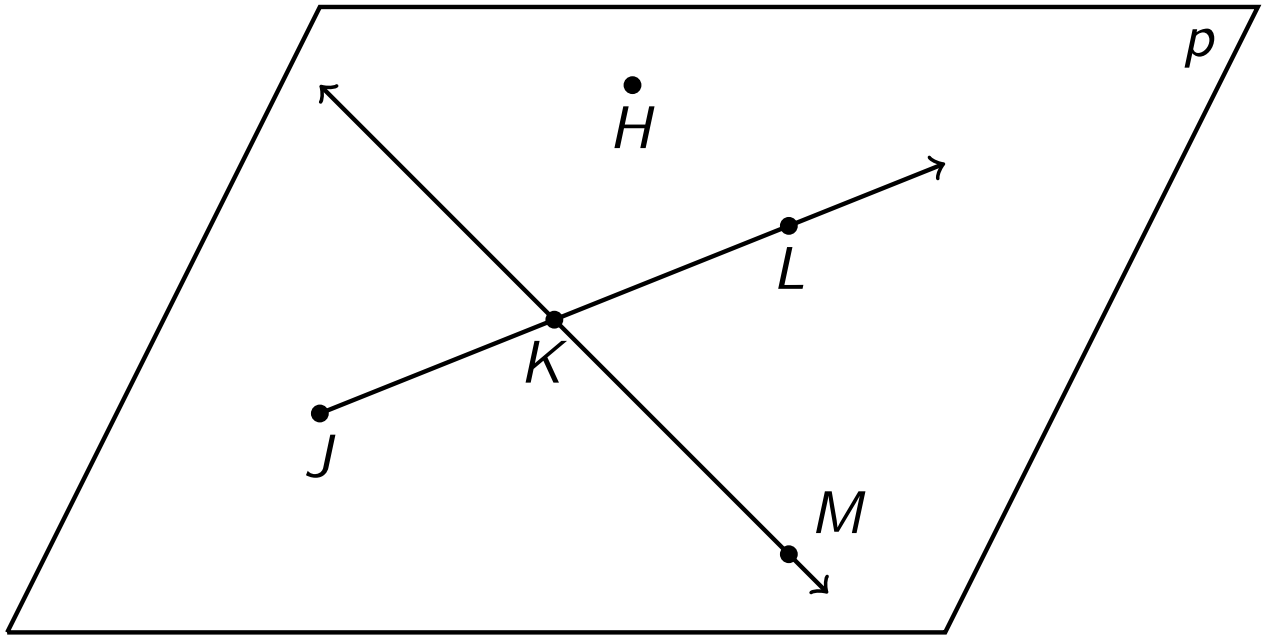


1. Mark and label the points and segment on the number line.
2. What is the length of the segment $\overline{GH}$? Show your work as an equation.

Identifying objects in a plane

Identify each item

1. The point H
2. The ray $\overrightarrow{JL}$
3. The name of the plane shown



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.

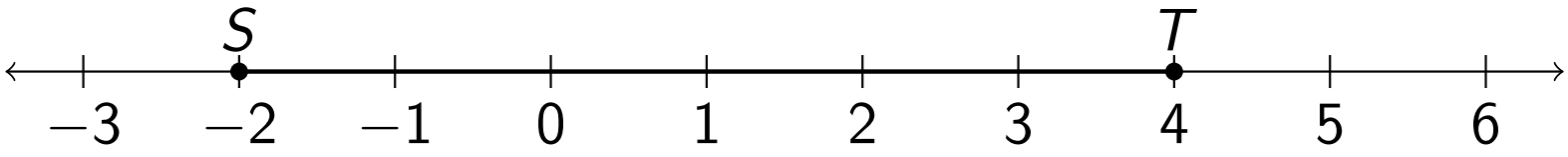
4. Drawn to *scale* means that all of the lengths are proportional. (e.g. a "scale model")

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

Learning Target: I can work with congruent segments

CCSS: HSG.CO.A.1 Know precise geometric definitions 1.5 Tuesday 21 Sept

Do Now: Given $\overline{ST}$ with $S(-2)$ and $T(4)$



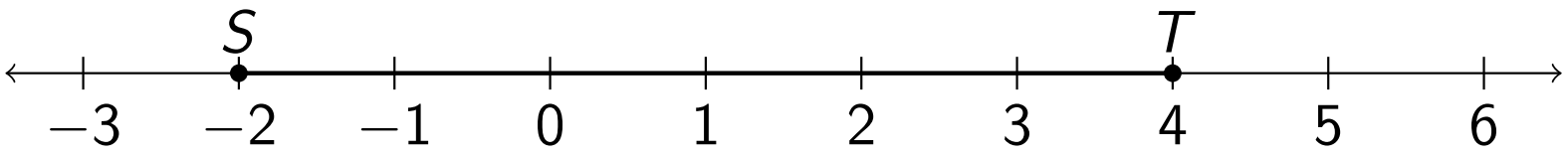
What is the length of the segment $\overline{ST}$? Show your work as an equation.

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

Negative number practice on a number line

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

Given $\overline{ST}$ with $S(-2)$ and $T(4)$, as shown on the number line.

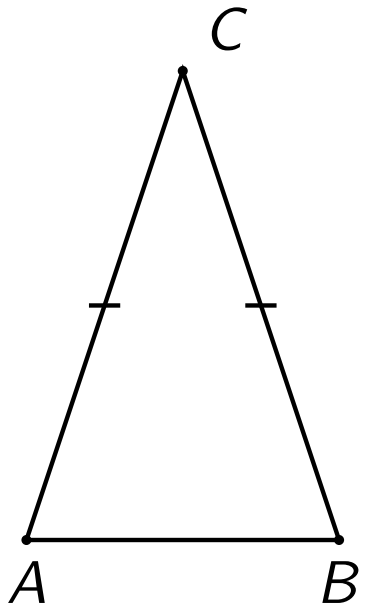


What is the length of the segment $\overline{ST}$? Show your work as an equation.

Why is "minus a negative" the same as add a positive?

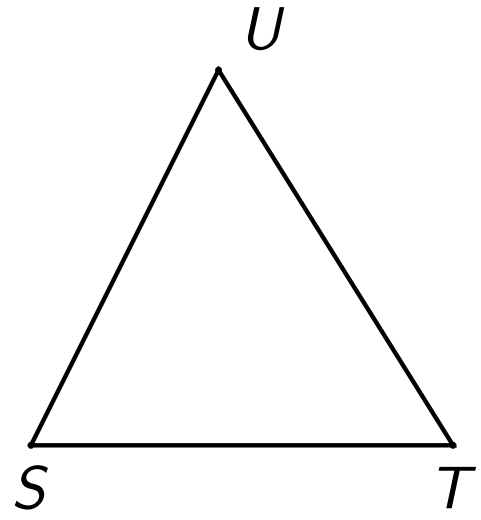
Use proper notation (including the bar over the letters)

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



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

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



Sketch an isosceles triangle

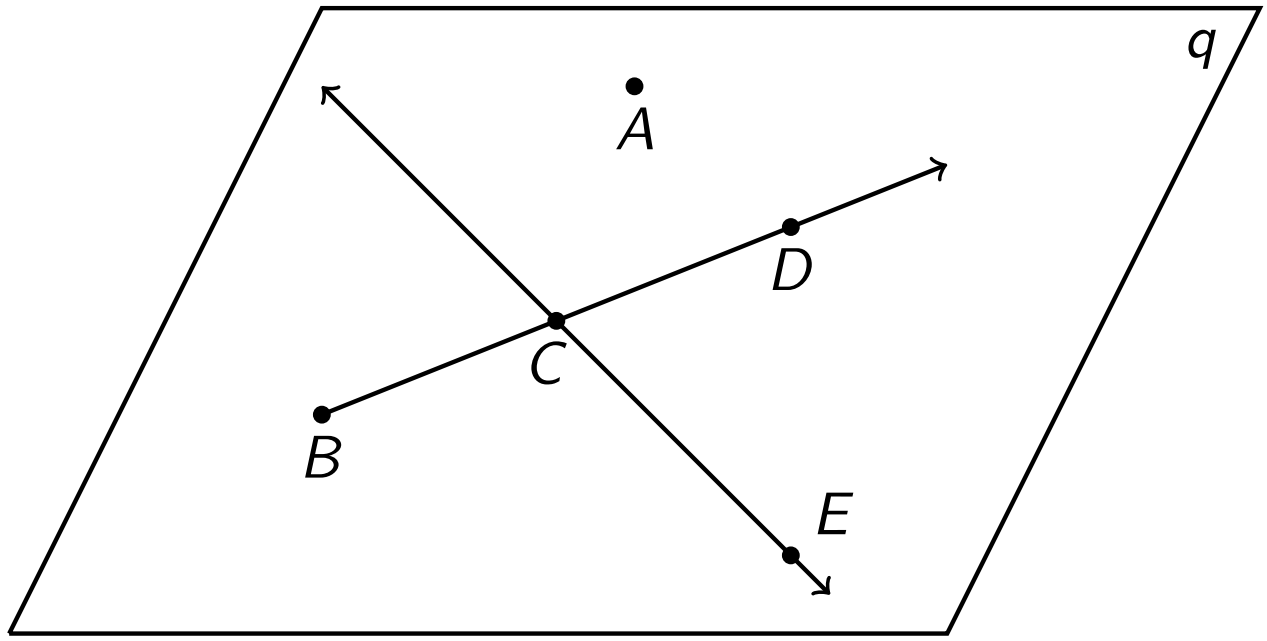
Mark the congruent sides with tick marks.

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

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

Identify each item.

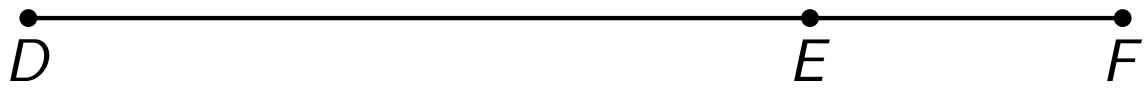
1. The point A
2. The ray $\overrightarrow{BD}$
3. The name of the plane



Apply the Segment Addition Postulate

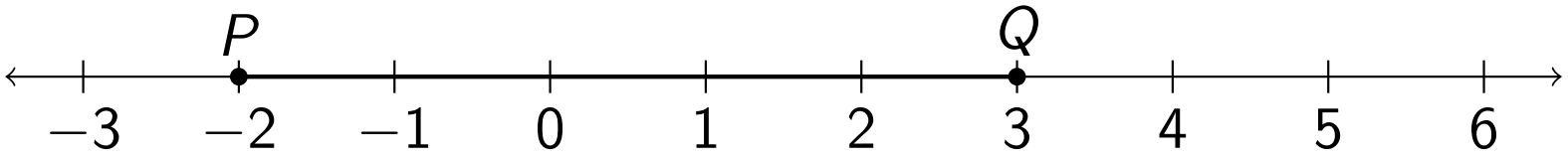
Show your work by marking the diagram and writing an equation.

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



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

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

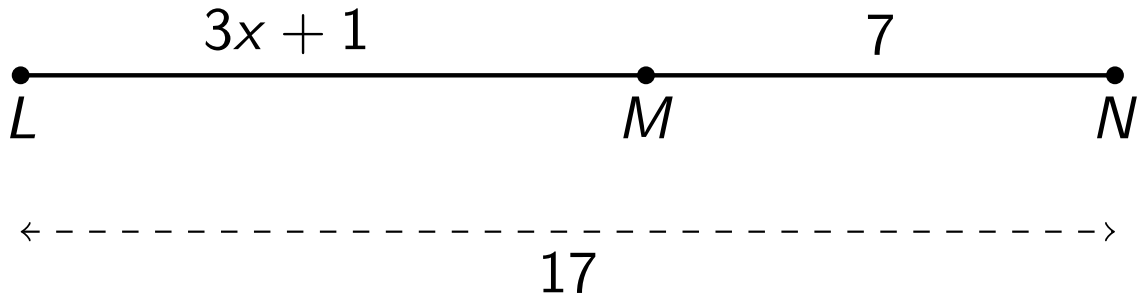


State an equation and the solution.

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

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.

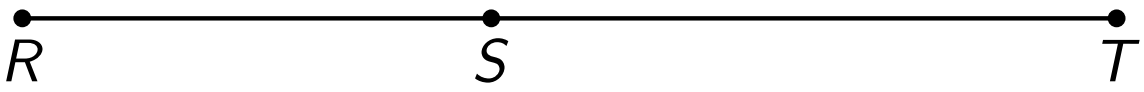
Solve for x given a bisector

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

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.



Learning Target: I can measure angles

CCSS: HSG.CO.A.1 Know precise geometric definitions 1.6 Wednesday 22 Sept

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