Name:

Chapter 1 Essentials of Geometry

Chapter 1 Vocabulary

Adjacent

Consecutive

Alternate

Bisect

Corresponding

Oblique

Point

Coincidental

Line

Plane

Collinear Points

Coplanar Points

Line Segment

Endpoints

Ray

Opposite Rays

Intersection

Ruler Postulate

Segment Addition Postulate

Congruent Segments

Midpoint

Segment Bisector

Midpoint Formula

Distance Formula

Angle

Sides

Vertex

Protractor Postulate

Angle Addition Postulate

Congruent Angles

Angle Bisector

Complementary Angles

Supplementary Angles

Adjacent Angles

Linear Pair

Vertical Angles

1.1 Identify Points, Lines and Planes

Point:

Segment:

Ray:

Line:

Opposite Rays:

Plane:

Collinear:

Coplanar:

How many points make a line?

How many points make a plane?

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2 lines intersecting…

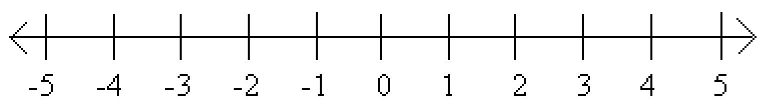
2 planes intersecting…

1.2 Use Segments and Congruence

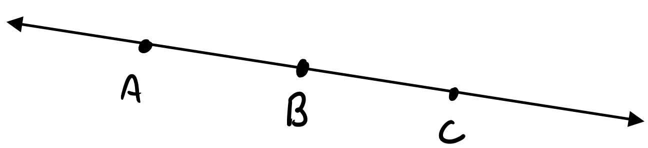
Postulate or Axiom:

Ruler Postulate: The points on a line can be matched one to one with real numbers. The real number that corresponds to a point is the coordinate of the point. The distance between the points A and B, written as *AB*, is the absolute value of the difference of the coordinates of A and B.

1.) Let point L have a coordinate of -2 and N have a coordinate of 3. What is *LN*?

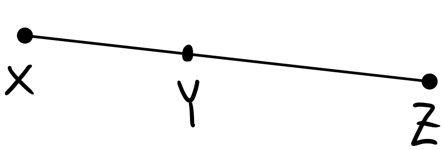


Segment Addition Postulate: If B is between A and C, then *AB* + *BC* = *AC*.



Use the diagram to find the indicated lengths.

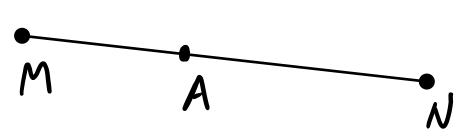
2.)



m$\overline{XZ}$ = 17
m$\overline{XY}$ = 4

m$\overline{YZ}$ = ?

3.)



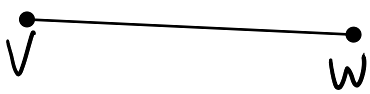
m$\overline{MN}$ = 30
m$\overline{MA}$ = 3x – 17
m$\overline{AN}$ = 2x + 2

m$\overline{MA}$ = ?
m$\overline{AN}$ = ?

1.3 Use Midpoint and Formula

Midpoint:

Segment Bisector:



1.) m$\overline{VM}$ = 11

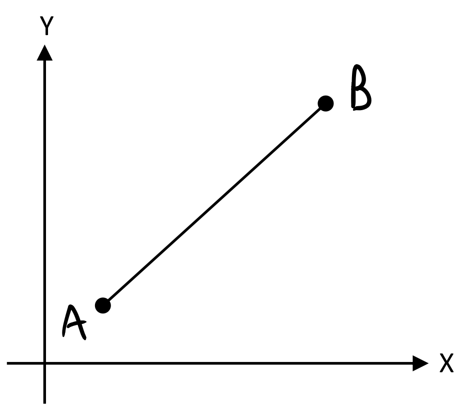
m$\overline{MW}$ = ?

2.) m$\overline{MW}$ = 11

m$\overline{MW}$ = ?

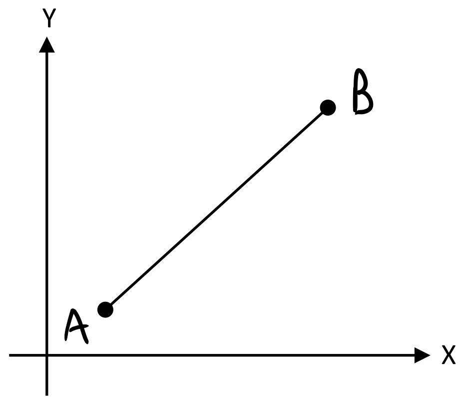
3.) m$\overline{VM}$ = 4x – 1
m$\overline{MW}$ = 3x + 3

m$\overline{VW}$ = ?



4.) The endpoints of $\overline{RS}$ are R(1, -3) and S(4,2). What are the coordinates of midpoint M?

1.3 Use Distance Formula

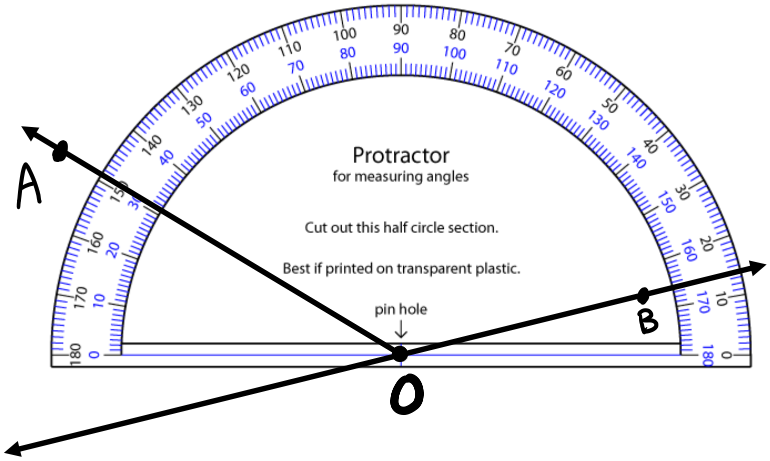


What is the approximate length of $\overline{RS}$ with endpoints R(2, 3) and S(4, -1). Round your answer to the nearest tenth.

1.4 Measure and Classify Angles

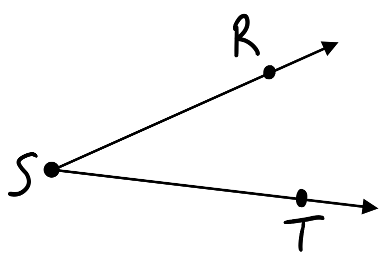
Angle: The space created by 2 different rays (segments or lines) with the same endpoint.

Protractor Postulate: Consider $\overleftrightarrow{OB}$ and a point A on one side of $\overleftrightarrow{OB}$. The rays of the form $\overrightarrow{OA}$ and $\overrightarrow{OB}$ can be matched one to one with the real numbers from 0 to 180. The measure of ∠AOB is equal to the absolute value of the difference between the real numbers for $\overrightarrow{OA}$ and $\overrightarrow{OB}$.

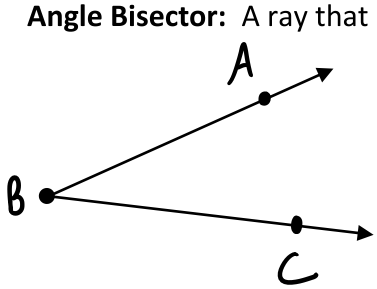


Acute: **Right:** **Obtuse:** **Straight:**

Angle Addition Postulate: If P is in the interior of ∠RST, then the measure of ∠RST is equal to the sum of the measures of ∠RSP and ∠PST.



Angle Bisector: A ray that divides an angle into two angles that are congruent.



1.5 Describe Angle Pair Relationships

Two angles are **adjacent** if they share a common vertex and side but have no common interior points.

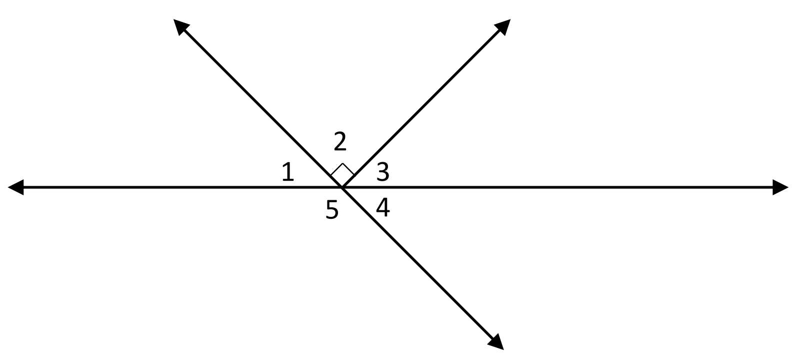
Two angles are **complementary** if the sum of their measures is 90°

Two angles are **supplementary** if the sum of their measures is 180°

Two adjacent angles are a **linear pair** if their noncommon sides are opposite rays. The angles in a linear pair are supplementary.

Two angles are **vertical angles** if their sides form two pairs of opposite rays.

Describe the angles.

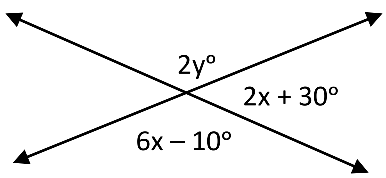


1.) ∢1 and ∢5 2.) ∢1 and ∢4 3.) ∢3 and ∢4 4.) ∢1 and ∢3

1.5 Angle Pair Relationships and Algebra

1.) $\angle LMN$ and $\angle PQR$ are complementary angles. Find the measure of the angles if $m\angle LMN = 4x - 2°$ and $m\angle PQR = 9x + 1$.

2.) Find the values of x and y.



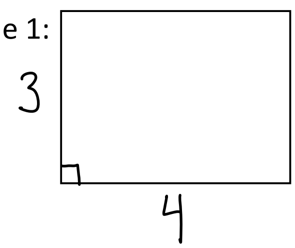
3.) 2 angles form a linear pair. One angle is 20° bigger than the other. What are the measures of each angle?

1.7 Find Perimeter, Circumference and Area

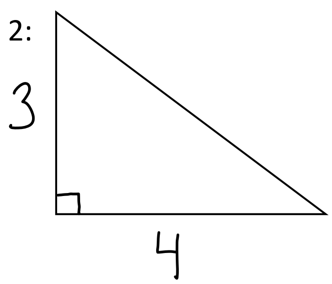
Perimeter:

Area:

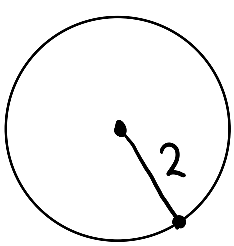
Example 1:



Example 2:

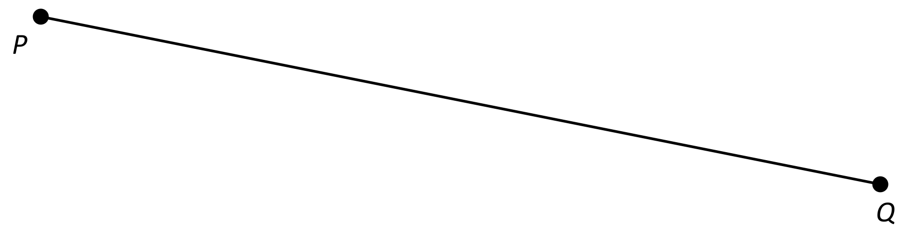


Example 3:



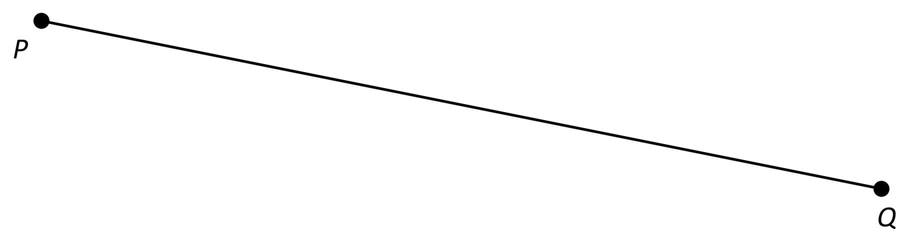
1.8 Constructions with a Compass

Copying a Line Segment



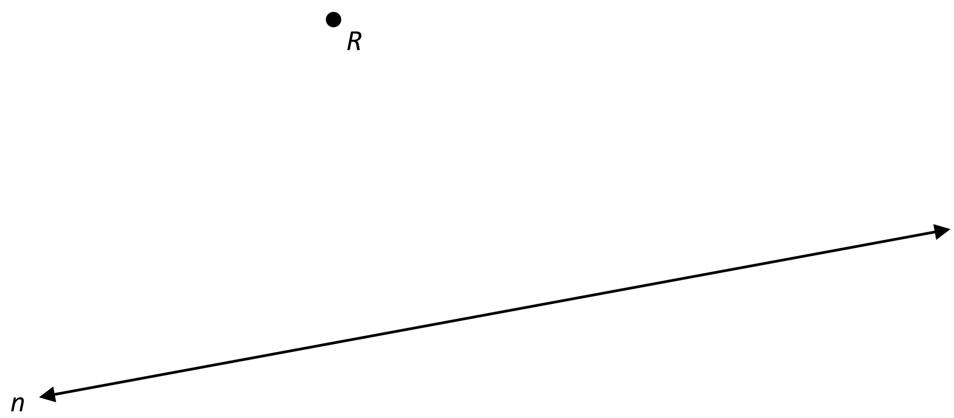
	Start with a line segment PQ that we will copy.
Step 1	Mark a point R that will be one endpoint of the new line segment.
Step 2	Set the compass point on the point P of the line segment to be copied.
Step 3	Adjust the compass width to the point Q. The compass width is now equal to the length of the line segment PQ.
Step 4	Without changing the compass width, place the compass point on the the point R on the line you drew in step 1
Step 5	Without changing the compass width, Draw an arc roughly where the other endpoint will be.
Step 6	Pick a point S on the arc that will be the other endpoint of the new line segment.
Step 7	Draw a line from R to S.
Step 8	Use a ruler to verify that the line segment RS is equal in length (congruent to) the line segment PQ.

Perpendicular Bisector of a Line Segment



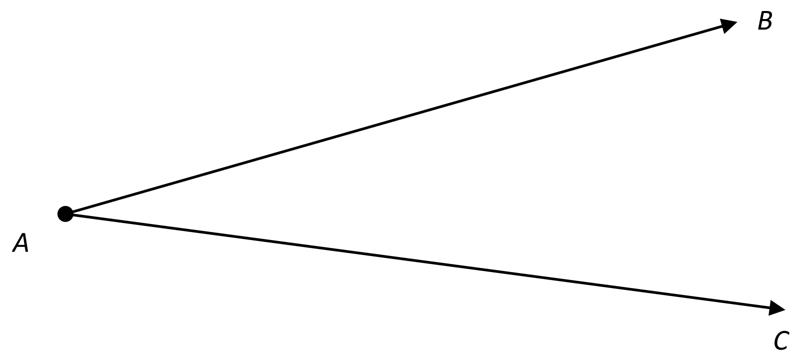
	Start with a line segment PQ.
Step 1	Place the compass on one end of the line segment.
Step 2	Set the compass width to approximately two thirds the line length. The actual width does not matter.
Step 3	Without changing the compass width, draw an arc above and below the line.
Step 4	Again without changing the compass width, place the compass point on the other end of the line. Draw an arc above and below the line so that the arcs cross the first two.
Step 5	Using a straightedge, draw a line between the points where the arcs intersect. Label the point created by the two lines J.
Step 6	Use a protractor to verify that the line is perpendicular to line PQ and use a ruler to verify that the line bisects line PQ (cuts it at the exact midpoint J of the line).

Perpendicular to a Line from an External Point



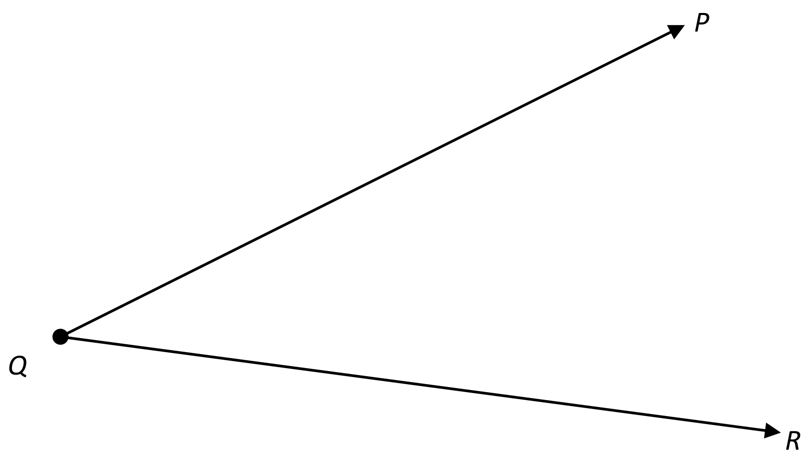
	Start with a line *n* and point R which is not on that line.
Step 1	Place the compass on the given external point R.
Step 2	Set the compass width longer than the distance to the line. The exact width does not matter.
Step 3	Draw an arc across line *n* on each side of R, making sure not to adjust the compass width in between. Label these points P and Q
Step 4	From each point P,Q, draw an arc below the line so that the arcs cross.
Step 5	Place a straightedge between R and the point where the arcs intersect. Draw the perpendicular line from R to the line, or beyond if you wish.
Step 6	Use a protractor to verify that the line is perpendicular to line *n* and passes through the point R.

Copy an Angle



	Start with an angle BAC that we will copy.
Step 1	Make a point P that will be the vertex of the new angle.
Step 2	From P, draw a ray PQ. This will become one side of the new angle. • This ray can go off in any direction. • It does not have to be parallel to anything else. • It does not have to be the same length as AC or AB.
Step 3	Place the compass on point A, set to any convenient width.
Step 4	Draw an arc across both sides of the angle, creating the points J and K as shown.
Step 5	Without changing the compass width, place the compass point on P and draw a similar arc there, creating point M as shown.
Step 6	Set the compass on K and adjust its width to point J.
Step 7	Without changing the compass width, move the compass to M and draw an arc across the first one, creating point L where they cross.
Step 8	Draw a ray PR from P through L and onwards a little further. The exact length is not important.
Step 9	Use a protractor to verify that the angle ∠RPQ is congruent (equal in measure) to angle ∠BAC.

Bisect an Angle



	Start with angle PQR that we will bisect.
Step 1	Place the compass point on the angle's vertex Q.
Step 2	Adjust the compass to a medium wide setting. The exact width is not important.
Step 3	Without changing the compass width, draw an arc across each leg of the angle.
Step 4	Open the compass width a little wider than it is currently. The exact length is not important.
Step 5	Place the compass on the point where one arc crosses a leg and draw an arc in the interior of the angle.
Step 6	Without changing the compass setting, repeat for the other leg so that the two arcs cross.
Step 7	Using a straightedge, draw a line from the vertex to the point where the arcs cross
Step 8	Use a protractor to verify that the two angles created are congruent to each other (equal in measure).