

1.1– Identify Points, Lines, and Planes

VOCABULARY

Point

Line

Plane

Collinear points

Coplanar points

Line segment, Endpoint

Ray, Initial point

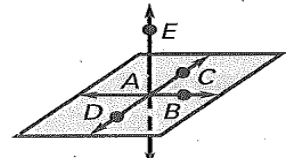
Opposite rays

Intersect

Intersection

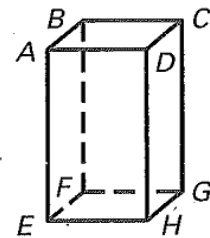
Example 1 Naming Collinear and Coplanar Points

- Name three points that are collinear.
- Name three points that are coplanar.
- Name four points that are not coplanar.



1. Name three points in the diagram that are not collinear.

2. Name the point in the diagram that is coplanar with points A, D, and E.

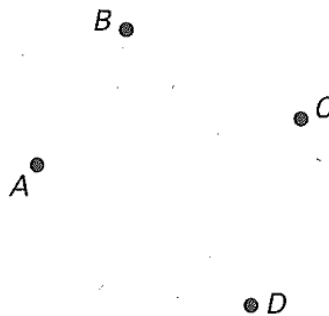


Example 2 Drawing Lines, Segments, and Rays

Draw four noncollinear points, A, B, C, and D. Then draw \overline{AB} , \overrightarrow{BC} , \overleftrightarrow{CD} , \overrightarrow{DA} , and \overrightarrow{BD} .

A, B, C, and D are shown.

- Draw \overline{AB} .
- Draw \overrightarrow{BC} .
- Draw \overleftrightarrow{CD} .
- Draw \overrightarrow{DA} .
- Draw \overrightarrow{BD} .



Example 3 Drawing Opposite Rays

Draw a line. Label three points on the line and name a pair of opposite rays.

Draw points X, Y, and Z on the given line so that Y is between X and Z.

The opposite rays are _____ and _____.



1.2– Use Segments and Congruence

VOCABULARY

Postulates

Coordinate

Distance

Length

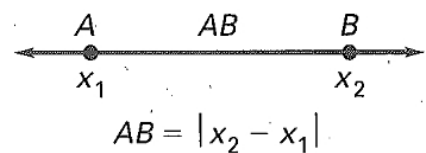
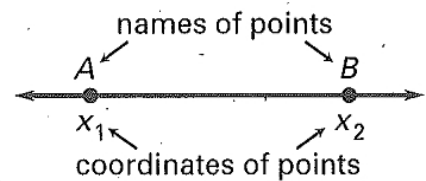
Congruent segments

POSTULATE 1: 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 _____ of the point.

The _____ between points A and B , written as AB , is the absolute value of the difference between the coordinates of A and B .

AB is also called the _____ of \overline{AB} .

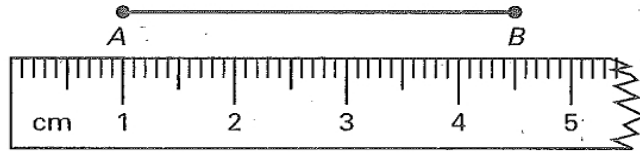


Example 1**Finding the Distance Between Two Points**

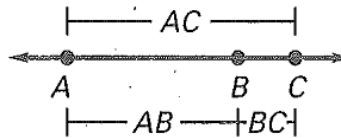
Measure the length of the segment to the nearest tenth of a centimeter.

$$AB = \begin{array}{|c} \hline \\ \hline \end{array} - \begin{array}{|c} \hline \\ \hline \end{array}$$

$$= \begin{array}{|c} \hline \\ \hline \end{array}$$

**POSTULATE 2: SEGMENT ADDITION POSTULATE**

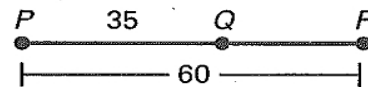
If B is between A and C , then $AB + BC = AC$. If $AB + BC = AC$, then B is between A and C .



3. Find JL .



4. Find QR .



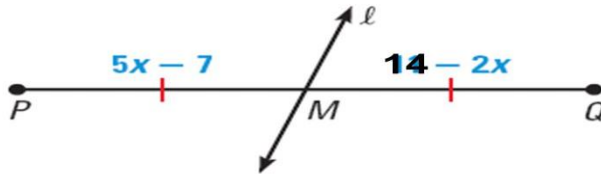
6. Plot the points $A(-2,4)$, $B(3,4)$, $C(0,2)$, and $D(0,-2)$ in a coordinate plane. Then determine whether \overline{AB} and \overline{CD} are congruent.

1.3 – Use Midpoint and Distance Formulas

Midpoint –

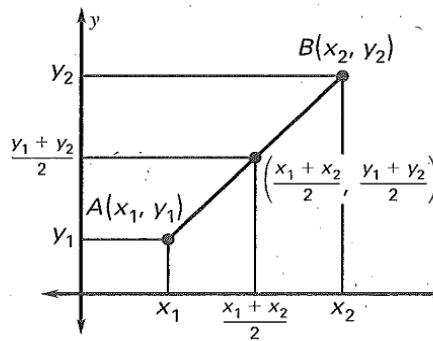
Segment bisector –

Identify the segment bisector of \overline{PQ} .
Then find PQ.



THE MIDPOINT FORMULA

If $A(x_1, y_1)$ and $B(x_2, y_2)$ are points in a coordinate plane, then the midpoint of \overline{AB} has coordinates

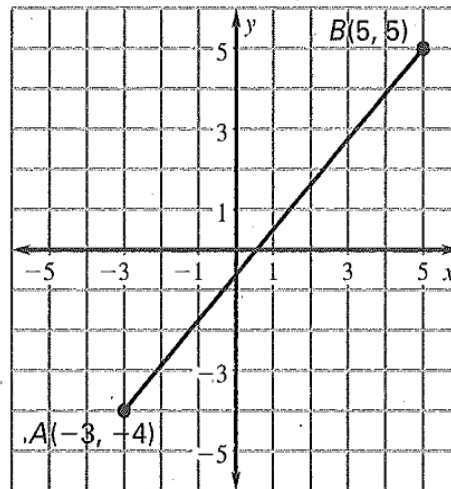


Example 1 Finding the Coordinates of the Midpoint of a Segment

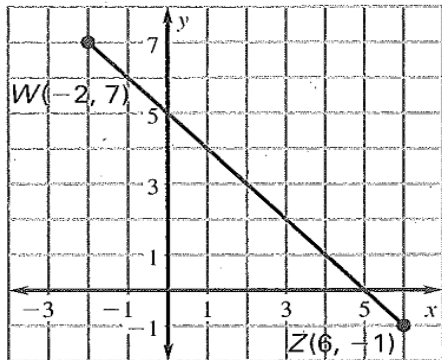
Find the coordinates of the midpoint of \overline{AB} with endpoints $A(-3, -4)$ and $B(5, 5)$.

Use the Midpoint Formula.

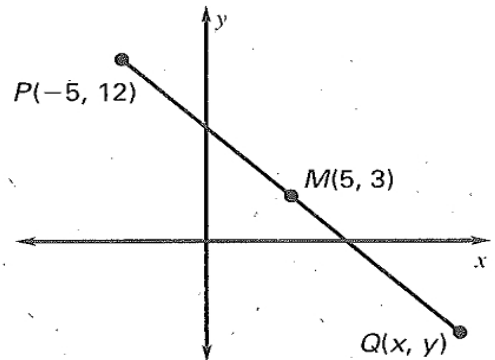
$M =$



1. Find the coordinates of the midpoint of \overline{WZ} .



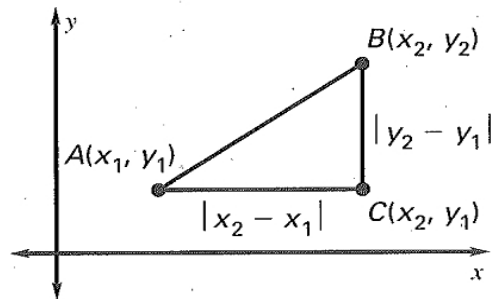
2. The midpoint of \overline{PQ} is $M(5, 3)$. Find the coordinates of Q .



THE DISTANCE FORMULA

If $A(x_1, y_1)$ and $B(x_2, y_2)$ are points in a coordinate plane, then the distance between A and B is

$AB =$ _____

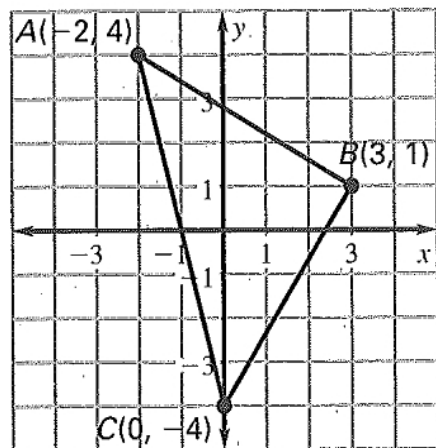


Example 3 Using the Distance Formula

Find the lengths of the segments. Tell whether any of the segments have the same length.

Use the Distance Formula.

$AB =$



1.4– Measure and Classify Angles

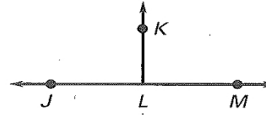
Angle, side, and vertex –

Example 1 Naming Angles

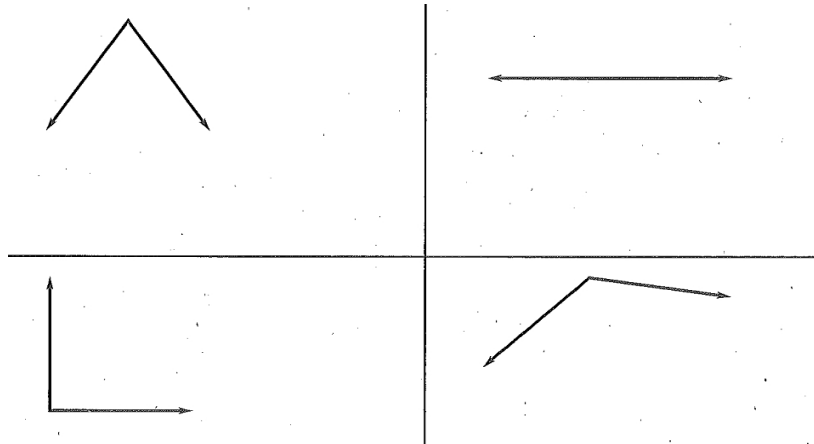
Name the angles in the figure.

There are three different angles.

- _____ or _____
- _____ or _____
- _____ or _____



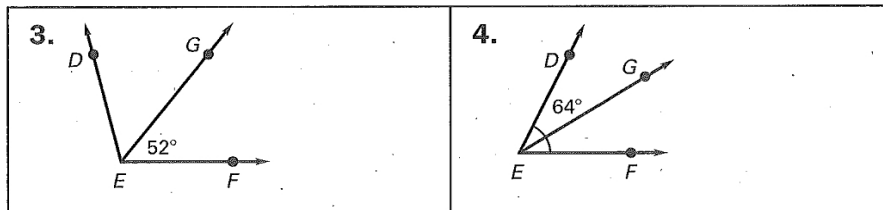
Classifying Angles –



Congruent Angles –

Angle Bisector –

- ✓ Checkpoint \overrightarrow{EG} is the angle bisector of $\angle DEF$. Find the two angle measures not given in the diagram.

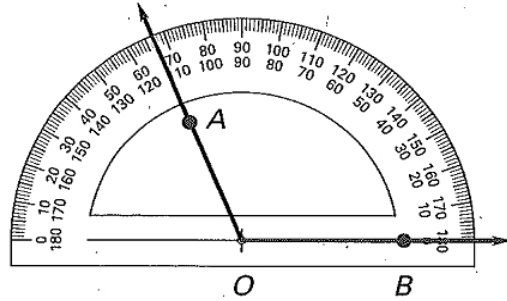


POSTULATE 3: PROTRACTOR POSTULATE

Consider a point A on one side of \overleftrightarrow{OB} . The rays of the form \overrightarrow{OA} can be matched one to one with the real numbers from 0 to _____.

The measure of _____ is equal to _____

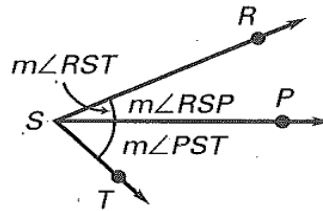
_____ between the real numbers for \overrightarrow{OA} and \overrightarrow{OB} .



POSTULATE 4: ANGLE ADDITION POSTULATE

If P is in the interior of $\angle RST$, then

$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}.$$

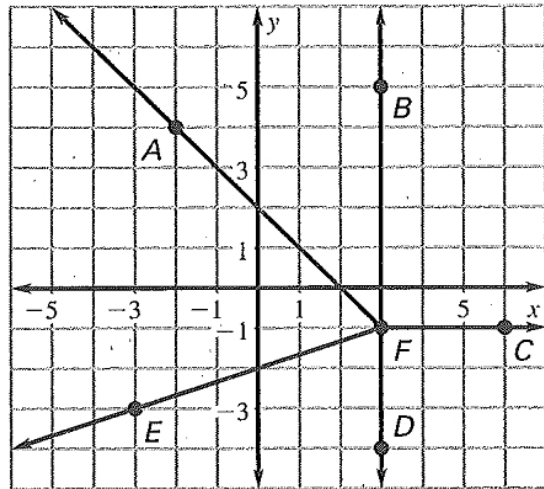


Example 3

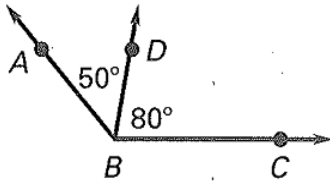
Classifying Angles in a Coordinate Plane

Measure the angle. Then classify the angle as acute, right, obtuse, or straight.

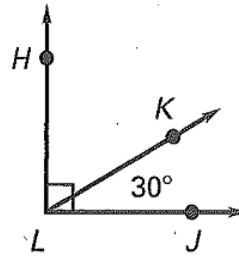
- $\angle AFD$
- $\angle AFE$
- $\angle BFD$
- $\angle BFC$



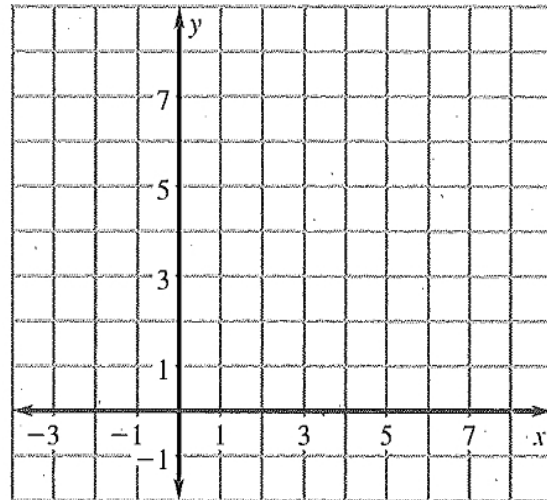
3. $m\angle ABC$



4. $m\angle HLK$

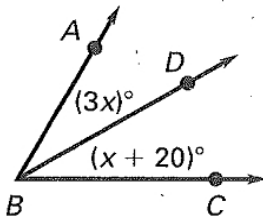


9. Plot the points $P(-2, 4)$, $Q(5, 7)$, $R(7, 2)$, and $S(1, -1)$. Then measure and classify $\angle PRS$.

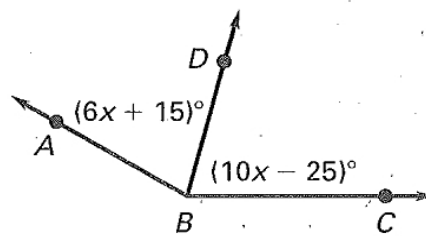


✔ Checkpoint \overrightarrow{BD} is the angle bisector of $\angle ABC$. Find $m\angle ABD$ and $m\angle DBC$.

5.



6.

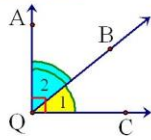


1.5– Describe Angle Pair Relationships

Complementary Angles

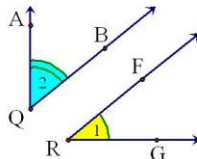
Definition: A pair of angles whose sum is 90°

Examples:



Adjacent Angles
(a common side)

$$m\angle 2 = 50^\circ \quad m\angle 1 = 40^\circ$$



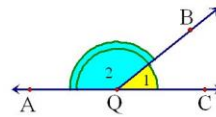
Non-Adjacent Angles

Supplementary Angles

Definition: A pair of angles whose sum is 180°

Examples:

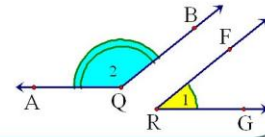
Adjacent supplementary angles are also called “Linear Pair.”



Non-Adjacent Angles

$$m\angle 1 = 40^\circ$$

$$m\angle 2 = 140^\circ$$



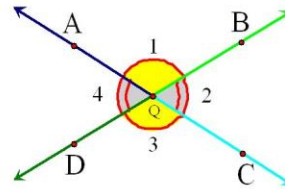
Vertical Angles

Definition: A pair of angles whose sides form opposite rays.

Examples:

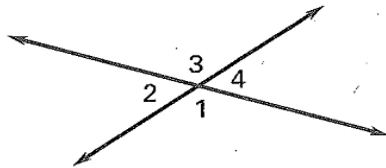
$$\angle 1 \text{ and } \angle 3$$

$$\angle 2 \text{ and } \angle 4$$

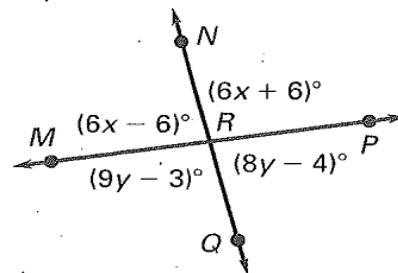


Vertical angles are non-adjacent angles formed by intersecting lines.

1. The measure of $\angle 2$ is 52° . Find the measures of $\angle 1$, $\angle 3$, and $\angle 4$.



2. Solve for x and y . Then find the angle measures.



Example 4 Finding Measures of Complements and Supplements

- a. Given that $\angle S$ is a complement of $\angle T$ and $m\angle S = 32^\circ$, find $m\angle T$.
 b. Given that $\angle U$ is a supplement of $\angle V$ and $m\angle U = 27^\circ$, find $m\angle V$.

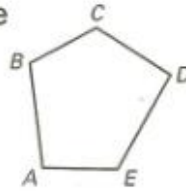
1.6– Classify Polygons

IDENTIFYING POLYGONS

In geometry, a figure that lies in a plane is called a *plane figure*. A _____ is a closed plane figure with the following properties.

1. It is formed by three or more line segments called _____.
2. Each side intersects exactly _____ sides, one at each endpoint, so that no two sides with a common endpoint are _____.

Each endpoint of a side is a _____ of the polygon. The plural of vertex is *vertices*. A polygon can be named by listing the vertices in consecutive order. For example, *ABCDE* and *CDEAB* are both correct names for the polygon at the right.



Sides –

Vertex –

Concave –

Convex –

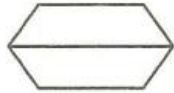
Polygon classification:

- Equilateral –
- Equiangular –
- Regular –

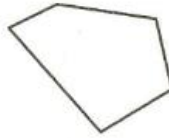
Example 1 Identify polygons

Tell whether the figure is a polygon and whether it is convex or concave.

a.



b.

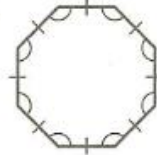


c.



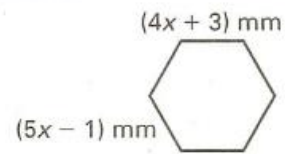
Example 2 Classify polygons

Classify the polygon by the number of sides. Tell whether the polygon is equilateral, equiangular, or regular.

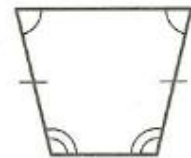


Example 3 Find side lengths

The head of a bolt is shaped like a regular hexagon. The expressions shown represent side lengths of the hexagonal bolt. Find the length of a side.



3. Classify the polygon by the number of sides. Tell whether the polygon is equilateral, equiangular, or regular.



4. The expressions $(4x + 8)^\circ$ and $(5x - 5)^\circ$ represent the measures of two of the congruent angles in Example 3. Find the measure of an angle.

1.7 - Find Perimeter, Circumference, and Area

PERIMETER, CIRCUMFERENCE, AND AREA FORMULAS

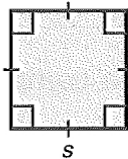
Formulas for the perimeter P , area A , and circumference C of some common plane figures are given below.

Square

side length s

$$P = \underline{\hspace{2cm}}$$

$$A = \underline{\hspace{2cm}}$$

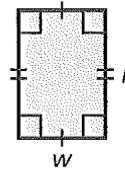


Rectangle

length l and width w

$$P = \underline{\hspace{2cm}}$$

$$A = \underline{\hspace{2cm}}$$

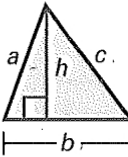


Triangle

side lengths a , b , and c , base b , and height h

$$P = \underline{\hspace{2cm}}$$

$$A = \underline{\hspace{2cm}}$$

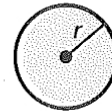


Circle

radius r

$$C = \underline{\hspace{2cm}}$$

$$A = \underline{\hspace{2cm}}$$



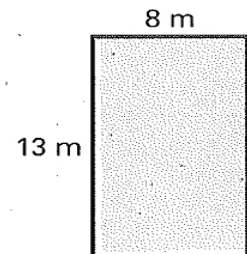
Pi (π) is the ratio of the circle's circumference to its diameter.

Example 1

Finding the Perimeter and Area of a Rectangle

Find the perimeter and area of the rectangle.

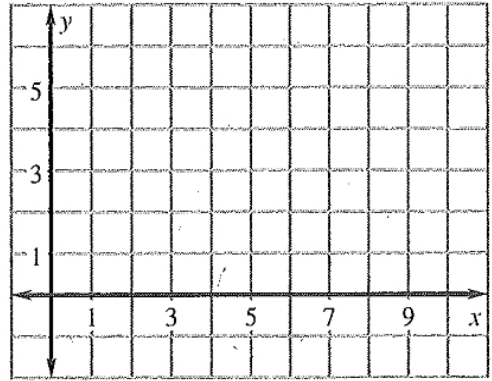
Use the formulas for the perimeter and area of a rectangle.



Checkpoint Find the area and the perimeter or circumference of the figure. Use 3.14 as an approximation for π .

<p>1.</p> <p>12 mm</p> <p>12 mm</p>	<p>2.</p> <p>15 in.</p> <p>20 in.</p> <p>25 in.</p>	<p>3.</p> <p>22 cm</p>
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4. Find the area and the perimeter of the triangle defined by $J(1, 4)$, $K(9, 4)$, and $L(4, 0)$.



Example 4 *Solve a multi-step problem*

Lawn care You are using a roller to smooth a lawn. You can roll about 125 square yards in one minute. About how many minutes does it take to roll a lawn that is 120 feet long and 75 feet wide?

Example 5 *Find unknown length*

The base of a triangle is 24 feet. Its area is 216 square feet. Find the height of the triangle.

Area of a triangle

