# Measuring Angles

Goal: To find and compare the measures of angles.

## Key Concept Angle

take note

Definition
An **angle** is formed by two rays with the same endpoint.

The rays are the **sides** of the angle. The endpoint is the **vertex** of the angle.

How to Name It
You can name an angle by
- its vertex, $\angle A$
- a point on each ray and the vertex, $\angle BAC$ or $\angle CAB$
- a number, $\angle 1$

Diagram

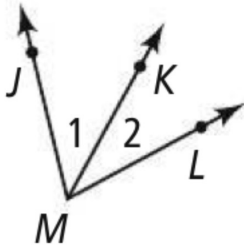The sides of the angle are $\overrightarrow{AB}$ and $\overrightarrow{AC}$.
The vertex is A.

Note: When you name an angle using 3 points, the vertex must always be in the middle.
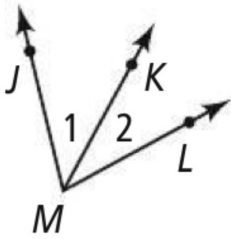
exterior

interior
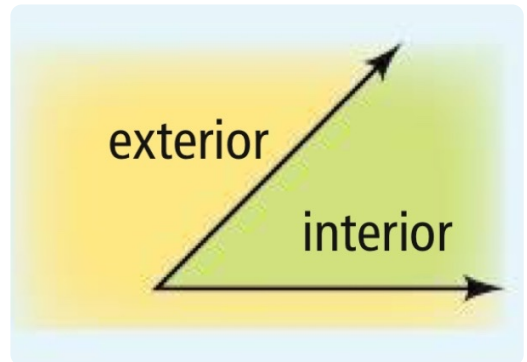
Ex 1a) What are two other names for ∠1?
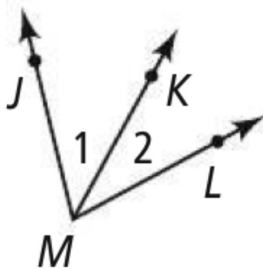
Ex 1b) What are two other names for

$$\angle KML?$$

Ex 1c) Would it be correct to name any
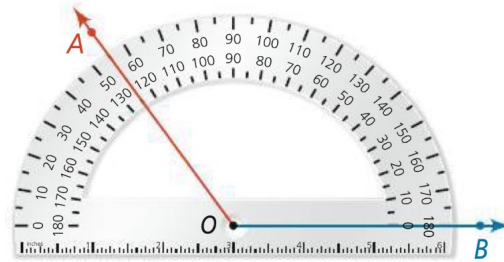## of the angles $\angle M$? Explain.

Note: One way to measure the size of an angle is in degrees. A circle has 360°, so 1° is $\frac{1}{360}$ of a circle.

Note: $\angle 1$ means   "angle 1"
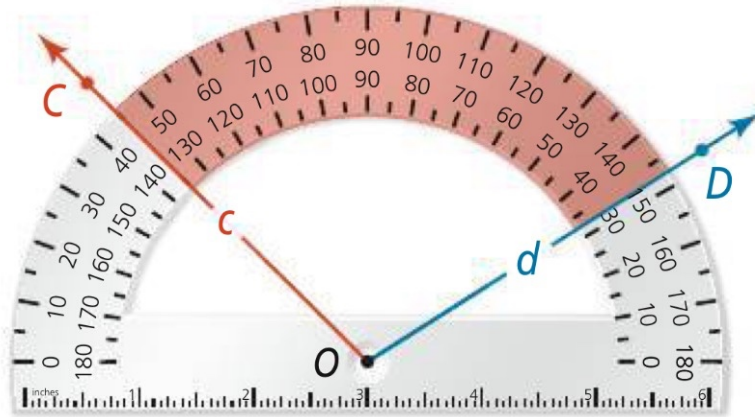
$m\angle 1$ means   "measure of angle 1"

Postulate 1-7 Protractor Postulate

Consider $\overrightarrow{OB}$ and a point A on one side of $\overrightarrow{OB}$. Every ray of the form $\overrightarrow{OA}$ can be paired one to one with a real number from 0 to 180.

take note

Note: The measure of ∠COD is the absolute value of the difference of the real numbers paired with $\overrightarrow{OC}$ and $\overrightarrow{OD}$.
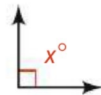
take note

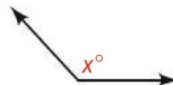## Key Concept Types of Angles
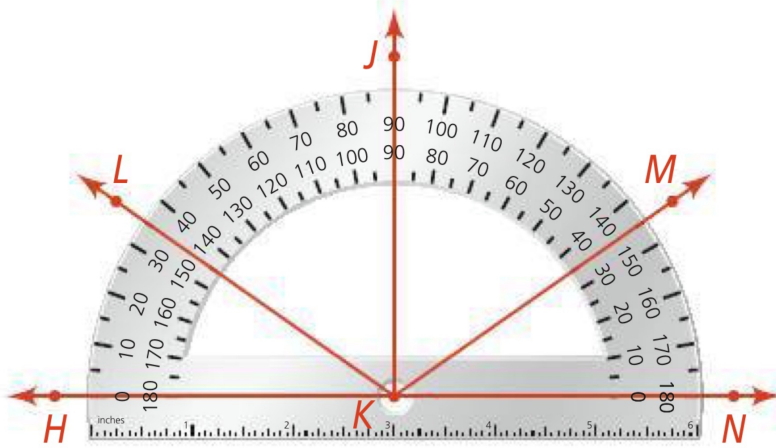
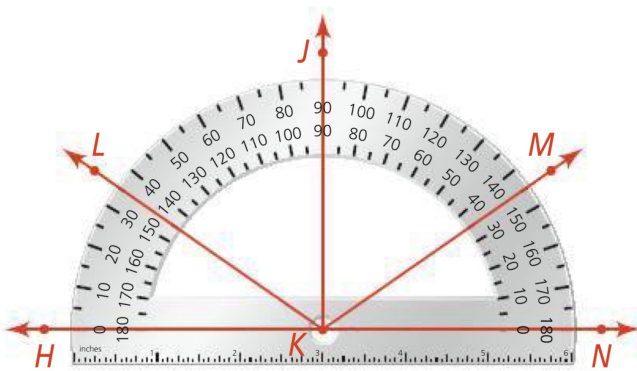| acute angle	right angle	obtuse angle	straight angle
$x°$	$x°$	$x°$	$x°$
$0 < x < 90$	$x = 90$	$90 < x < 180$	$x = 180$

Ex 2a) What are the measures of ∠LKN, ∠JKL, and ∠JKN? Classify each angle as right, acute, obtuse, or straight.

Ex 2b) What are the measurements of ∠LKH, ∠HKN, and ∠MKH? Classify each angle as right, acute, obtuse, or straight.

<u>Def:</u> Angles with the same measure are called <u>congruent angles.</u>
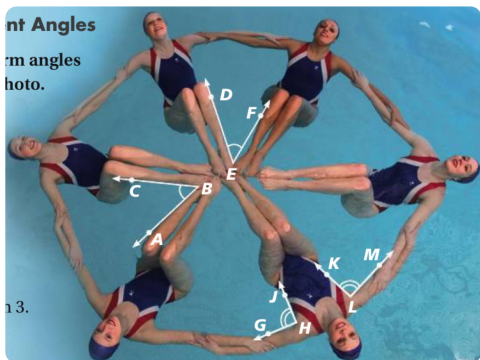
- This means that. . . .

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- *Note the way to mark $\cong$ angles on a picture

IF $m\angle A = m\angle B$,

Then $\angle A \cong \angle B$.

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Ex 3a) Synchronized swimmers form angles with
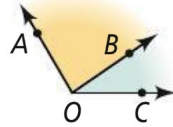
their bodies, as shown in the photo.

If $m\angle GHJ = 90$, what is $m\angle KLM$?

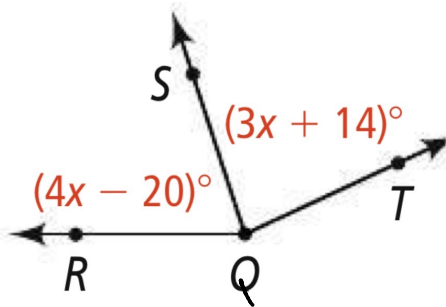Ex 3b) If $m\angle ABC = 49$, what is $m\angle DEF$?

Postulate 1-8 Angle Addition Postulate

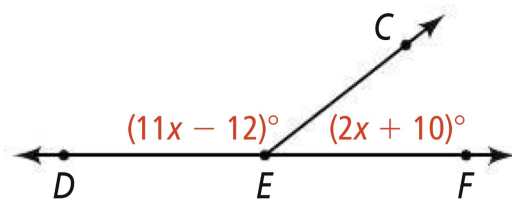If point *B* is in the interior of ∠*AOC*,
then *m*∠*AOB* + *m*∠*BOC* = *m*∠*AOC*.

Ex 4a) If m∠RQT= 155°, what are
m∠RQS and m∠TQS?

S
$(3x + 14)°$
$(4x - 20)°$
T
R   Q

4b) ∠DEF is a straight angle. What
are m∠DEC and m∠CEF?

C
$(11x - 12)°$ $(2x + 10)°$
D   E   F
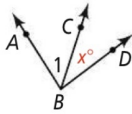
Lesson Check

Lesson Check

Do you know HOW?
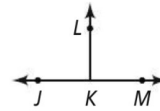Use the diagram for Exercises 1–3.

1. What are two other names for $\angle 1$?

2. **Algebra** If $m\angle ABD = 85$, what is an expression to represent $m\angle ABC$?

3. Classify $\angle ABC$.

Do you UNDERSTAND? MATHEMATICAL PRACTICES

4. **Vocabulary** How many sides can two congruent angles share? Explain.

5. **Error Analysis** Your classmate concludes from the diagram below that $\angle JKL \cong \angle LKM$. Is your classmate correct? Explain.

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For a review on Angles and measuring them with a protractor, search for the following video on YouTube:

"the Best Angles Math Song (with Bonus dancing cats)"

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Homework:
Textbook P. 31-32 #8, 10, 13, 17, 18, 20, 22-23, 29-30, 33, 35

(12 problems total)

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