

Grade 4 Target K

Domain, Target, Standards, DOK, Vertical Alignments, Achievement Levels, Evidence Required, Vocabulary, Response Types, Materials, Attributes, Question Types, and Question Banks (Examples)

[Content Domain: Measurement and Data](#)

[Target K \[s\]: 4.MD.C Geometric measurement: understand concepts of angle and measure angles.](#)

[Standards included in Target K: 4.MD.C, 4.MD.C.5, 4.MD.C.5a, 4.MD.C.5b, 4.MD.C.6, 4.MD.C.7](#)

[Vertical Alignment](#)

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Content Domain: Measurement and Data

Target K [s]: 4.MD.C Geometric measurement: understand concepts of angle and measure angles.

Standards included in Target K: 4.MD.C, 4.MD.C.5, 4.MD.C.5a, 4.MD.C.5b, 4.MD.C.6, 4.MD.C.7

4.MD.C Geometric measurement: understand concepts of angle and measure angles.

4.MD.C.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

- a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $\frac{1}{360}$ of a circle is called a “one-degree angle,” and can be used to measure angles.
- b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.

4.MD.C.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

4.MD.C.7 Recognize angle measure as additive. When an angle is decomposed into

non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

Vertical Alignment

Related Grade 3 standards

None

Related Grade 5 Standards

None

Achievement Level Descriptors

Level 1 No Descriptor

Level 2 Students should be able to recognize whole-number degrees on a protractor and measure angles in whole-number degrees using a protractor.

Level 3 Students should be able to construct angles in whole-number degrees using a protractor, use understanding of angle concepts to decompose a larger angle with two or more smaller angles that have the same sum as the original, and determine an unknown angle measure in a diagram.

Level 4 Students should be able to solve addition and subtraction problems to find unknown angles on a diagram in problems by using an equation with a symbol for the unknown angle measure.

Evidence Required

1. The student relates the concept of an angle to the fraction of a circular arc between two points on a circle.
2. The student uses a protractor to measure angles (composed of one-degree angles) and construct angles to whole-number degrees.
3. The student decomposes an angle into smaller non-overlapping parts and adds the measures of these smaller parts to find the measure of the whole angle.
4. The student solves addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems.

Vocabulary

protractor, angle, ray, intersect, one-degree angle, vertex, ray

Response Types

Equation/Numeric; Graphing; Drag and Drop

Materials

graphics of angles, turns, and rotations; protractors

Attributes

Benchmark angles are 30° , 45° , 60° , 90° , 180°

Claim 1: Concepts and Procedures (DOK 1, 2) Question Banks

Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.

Claim 1 4.MD.C.5 DOK Level 2

Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

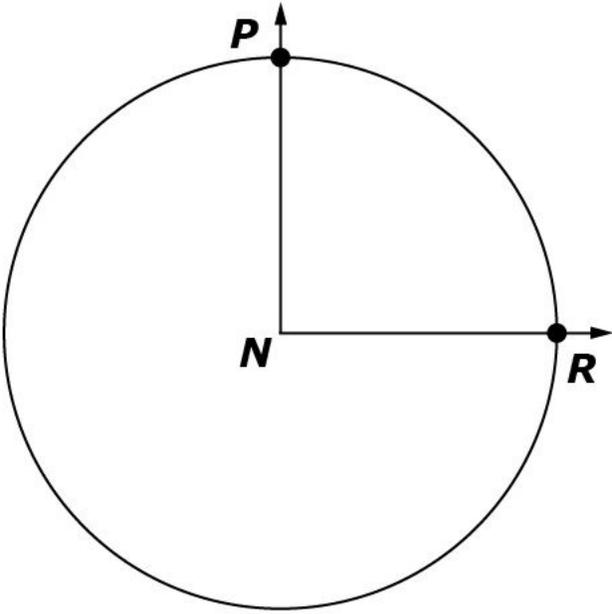
- a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $\frac{1}{360}$ of a circle is called a “one-degree angle,” and can be used to measure angles.
- b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.

Evidence Required

The student relates the concept of an angle to the fraction of a circular arc between two points on a circle.

Question Type 1: The student is presented with an angle superimposed on a circle with its vertex at the center of the circle and the fraction of a circular arc that it represents.

The vertex of $\angle PNR$ is at the center of the circle. The circular arc between Point P and Point R is $\frac{1}{4}$ of the circle.



Enter the measure, in degrees, of $\angle PNR$.

Rubric: The student enters the correct number of degrees (e.g., 90).

Response Type: Equation/Numeric

Claim 1 4.MD.C.6 DOK Level 1

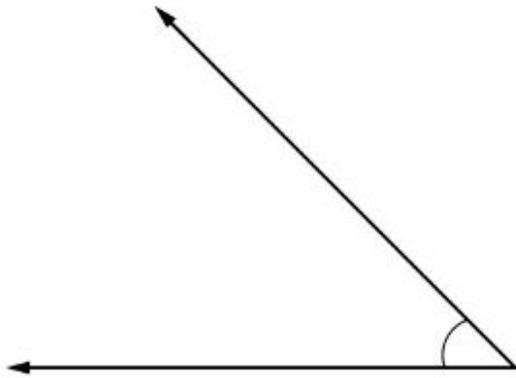
Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

Evidence Required

The student uses a protractor to measure angles (composed of one-degree angles) and construct angles to whole-number degrees.

Question Type 1: The student is presented with an image of an angle.

- Use the protractor to measure the angle.
- Then drag the numbers into the box to enter the measure of the angle, in degrees.



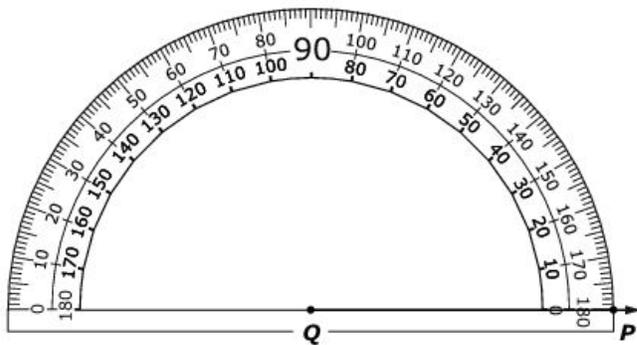
0	5
1	6
2	7
3	8
4	9

Rubric: (1 point) The student enters the correct number of degrees in the angle (e.g., 45).

Response Type: Drag and Drop

Question Type 2: The student is presented with an angle measure and instructions to generate the angle.

Use the Add Arrow tool to draw a 45° angle that has ray QP as one of its sides.

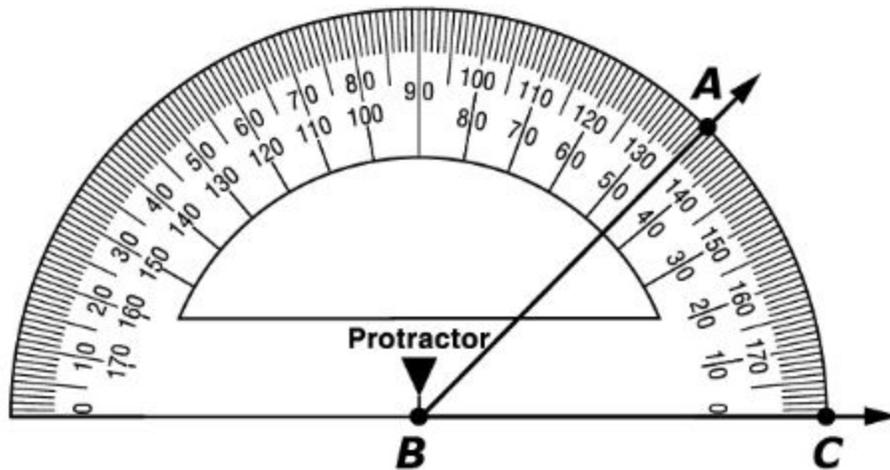


Rubric: (1 point) The student creates an angle of given measure with the given ray as one of its sides (e.g., 45°).

Response Type: Graphing

Question Type 3: The student is presented with an angle imposed on a protractor and given instructions to find the measure of the angle.

Enter the measure, in degrees, of $\angle ABC$.



Rubric: (1 point) The student enters the correct angle measure, in degrees (e.g., 45).

Response Type: Equation/Numeric

Claim 1 4.MD.C.7 DOK Level 2

Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real-world and

These pages were adapted from open source documents available on the Smarter Balanced Website: <http://www.smarterbalanced.org/assessments/development/> August 2016

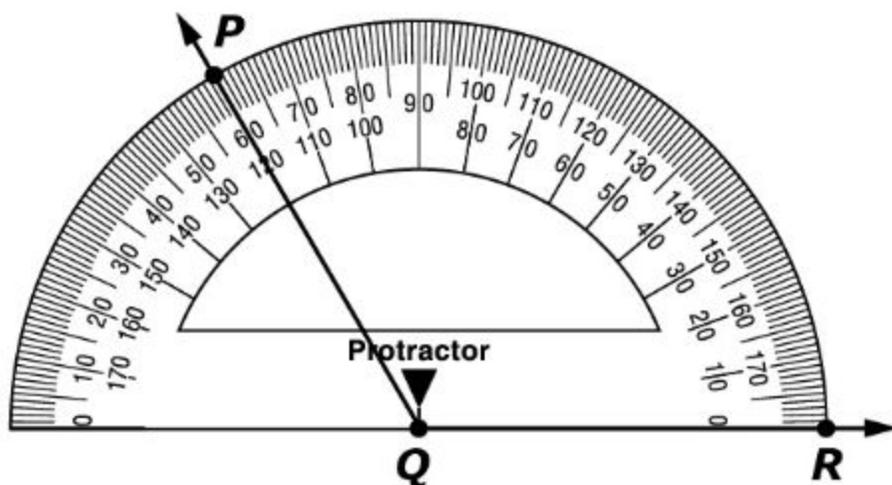
mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

Evidence Required

The student is presented with an angle that is decomposed into non-overlapping parts.

Question Type 1: The student is presented with a protractor showing an angle.

The protractor shows the measure of $\angle PQR$. Use the Add Arrow tool to divide $\angle PQR$ into two equal angles.



Rubric: (1 point) The student draws a ray that correctly divides the angle into two equal angles (e.g., two 60° angles).

Response Type: Graphing

Claim 1 4.MD.C.7 DOK Level 2

Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

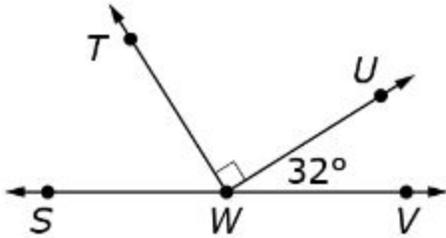
Evidence Required

The student solves addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems.

Question Type 1: The student is presented with problems in real-world or mathematical contexts involving the use of angle measures of decomposed angles.

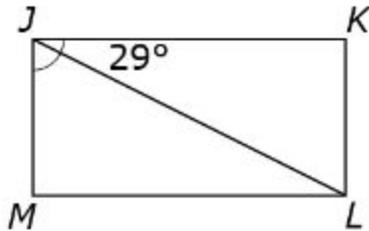
1. Use the figure to answer the question.

- The measure of $\angle UWV = 32^\circ$.
- $\angle TWU$ is a right angle.
- The measure of $\angle SWV = 180^\circ$.



Enter the measure, in degrees, of $\angle SWT$.

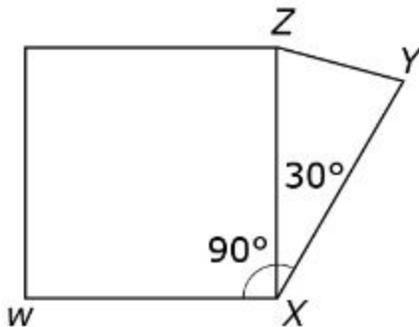
2. In the figure shown, JKLM is a rectangle and $\angle KJL = 29^\circ$.



Enter the measure, in degrees, of $\angle MJL$.

3. A student made the design shown with shapes.

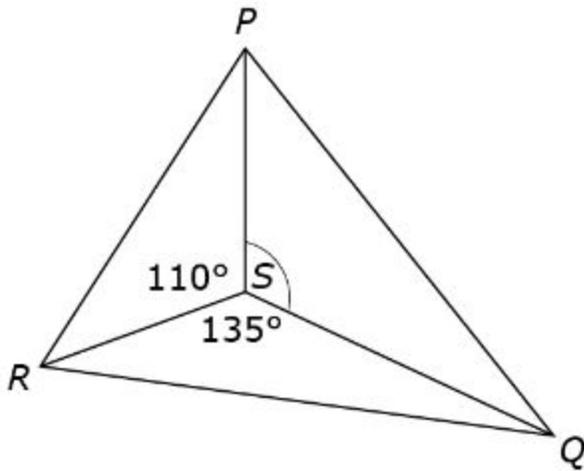
- The measure of $\angle WXZ = 90^\circ$.
- The measure of $\angle YXZ = 30^\circ$.



Enter the measure, in degrees, of $\angle WXY$.

4. A student made the design shown with shapes.

- The measure of $\angle PSR = 110^\circ$.
- The measure of $\angle RSQ = 135^\circ$.



Enter the measure, in degrees, of $\angle PSQ$.

Rubric: (1 point) The student enters the correct angle measure in degrees (e.g., 58; 61; 120; 115).

Response Type: Equation/Numeric

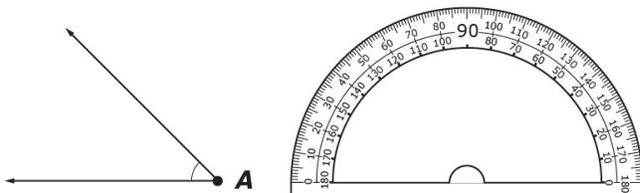
Claim 2 Problem Solving Questions Banks

[Claim Descriptors and Targets](#)

Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies.

Example 1

Use the protractor to find the measure of angle A.



Enter the measure of angle A, to the nearest whole degree, in the response box.

Interaction: The student can move the protractor to any point on the screen and rotate the protractor to align it with a side of the angle.

Rubric: (1 point) Student enters the correct angle measure in degrees (45+/-?).

Response Type: Equation/numeric

Commentary: An item that could assess the same construct with current technology would show a protractor with an angle whose vertex is aligned to the center point of the angle but whose rays are not aligned to the 0 or 180 marks on the protractor. This item type would fall under task model 2B.

Claim 3 Communicating Reasoning Question Banks

[Claim Descriptors and Targets](#)

Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.

Example 1

When you cut an obtuse angle into two smaller angles, what can be true? (Select all that apply.)

- A. The two smaller angles can be less than 90 degrees.
- B. At least one of the two smaller angles can be greater than 90 degrees.
- C. Both of the two smaller angles can be greater than 90 degrees.

Rubric: (1 point) The student selects the possible cases (A and B).

Response Type: Multiple Choice, multiple correct response