Assessment : End-of-Unit Assessment

Teacher Instructions

Give students access to protractors.

Problem 1

Students identify two segments in a drawing and analyze the angles made by the lines containing those segments. The lines are not parallel because they meet at the center of the X and they are not perpendicular either. Students may use a protractor to check that the angles do not measure 90 degrees or they may visually identify that the lines are not perpendicular.

Statement

Here is Andre's drawing of two line segments.

1. Circle Andre's two segments.
2. If the segments are extended in both directions, are the lines parallel? Are they perpendicular? Explain how you know.

Solution

1. Student circles or labels the two segments making the X.

2. No, the lines are not parallel because they meet in the middle of the X. They are also not perpendicular because the angles where the lines meet are not right angles.

Aligned Standards

4.G.A.1

Problem 2

Students evaluate claims about the angles that make right angles and full circles. Students who do not select A or C may understand that the measure of a full circle is 360 degrees and the measure of a right angle is 90 degrees but have not connected that idea to the notion of many one-degree angles making up these larger angles. Students who select B or D need more practice measuring angles and in particular practice with problems that use the fact that there are 180 degrees in a line to find the value of different angles. Students can reason about E using either the additivity of angles or by thinking about a pair of perpendicular lines.

Statement

Select **all** correct statements.

A. There are 360 one-degree angles in a circle.

B. There are 180 one-degree angles in a circle.

C. There are 90 one-degree angles in a right angle.

D. There are 180 one-degree angles in a right angle.

E. There are 4 right angles in a circle.

Solution

["A", "C", "E"]

Aligned Standards

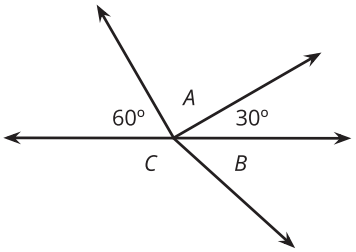
4.MD.C.5, 4.MD.C.7

Problem 3

Students identify different types of angles in a diagram. They can visually identify that angle B is acute and angle C is obtuse. They can calculate that angle A is a right angle since it makes a 180 degree angle along with the angles labeled as 30 degrees and 60 degrees. Students who select E probably do not understand what acute and obtuse angles are. Students who select A or D may be measuring inaccurately with a protractor rather than using the additivity of angles. These students may understand what acute and obtuse angles are.

Statement

The 60° angle, the 30° angle, and angle A together make a straight angle.



Select **all** correct statements.

A. Angle A is acute.

B. Angle B is acute.

C. Angle C is acute.

D. Angle A is obtuse.

E. Angle B is obtuse.

F. Angle C is obtuse.

Solution

["B", "F"]

Aligned Standards

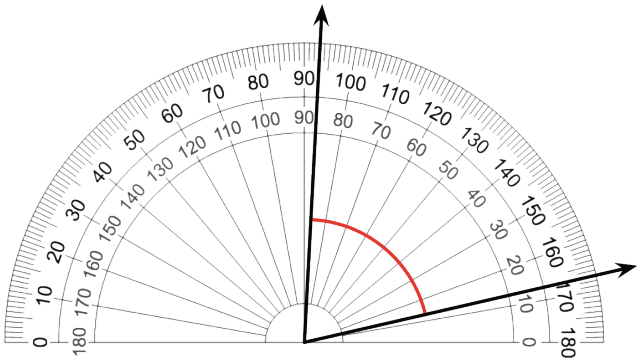
4.MD.C.7

Problem 4

Students find the measure of an angle using an image of a protractor. Students who select C or D are likely using the protractor to identify one of the two rays but are not performing arithmetic with those numbers to find the measure of the angle. Students who select B have either made an arithmetic error or possibly subtracted 93 from 180 which would be another misuse of the protractor.

Statement

What is the measure of the angle?



A. 74 degrees

B. 87 degrees

C. 93 degrees

D. 167 degrees

Solution

A

Aligned Standards

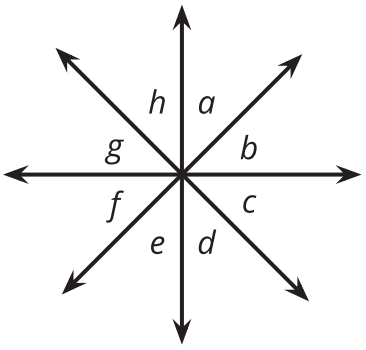
4.MD.C.6

Problem 5

Students find the measure of an angle using the facts that there are 360 degrees in a full circle and that angle measure is additive. Students may reason that 8 of these angles make 360 degrees, 4 of them make 180 degrees, or 2 of them make 90 degrees. It is not given that 2 of the angles make a 90 degree angle or that 4 of them make a line but students can find this by measuring or use their visual intuition for 90 degree and 180 degree angles.

Statement

Angles a–h each have the same measurement. What is that measurement? Explain or show your reasoning.



Solution

45 degrees. The full circle is 360 degrees and it is divided into 8 equal angles and $360 \div 8 = 45$.

Aligned Standards

4.MD.C.5, 4.MD.C.7

Problem 6

Students construct two angles of given measures and then use these angles to define a third angle and find its measure. For the third part, depending on how students construct the two angles, the answer can be 85 degrees or 35 degrees. If students use a protractor to measure this new angle, they may get a slightly different answer while they will get an exact answer if they use angle additivity.

Statement

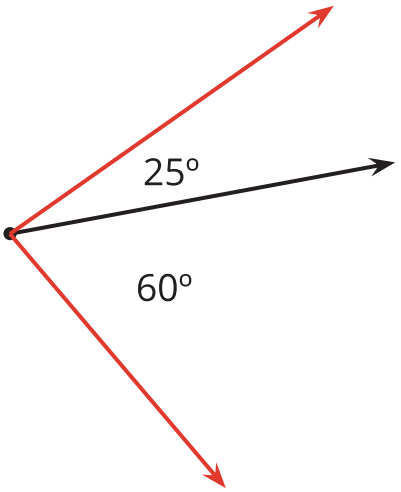
Use a protractor to complete the following:

1. Draw a ray that makes a 25 degree angle with the given ray.
2. Draw a ray that makes a 60 degree angle with the given ray.
3. What is the size of the angle made by the two rays you drew? Explain how you know.

Solution

Sample response:

1. See drawing.
2. See drawing.
3. The angle on top measures 25° and the angle on bottom is 60°. The two rays make an angle of 85° ($60 + 25 = 85$).



Aligned Standards

4.MD.C.6, 4.MD.C.7

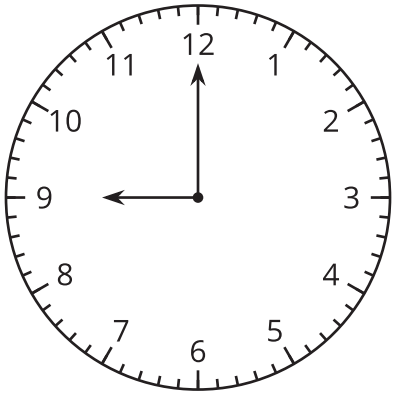
Problem 7

Students find the measure of angles made by clock hands. For the first problem, they will likely recognize that the hands make a right angle. For the second problem, they need to use the additivity of angles and the fact that the hours on the clock face divide the entire circle into 12 equal angles, each of which measures 30 degrees. Combined with the fact that half of 30 is 15 this is the key idea that will help students find how long it takes for the hour hand to move through a 15 degree angle.

Statement

1. The clock shows when Diego's spelling class begins.

   What angle do the hour and minute hand on the clock make?



2. During the spelling class, the hour hand turns 15 degrees. How long is the spelling class? Explain or show your reasoning.

Solution

1. 90 degrees or 270 degrees
2. Half an hour. Sample response:
    - From 9 to 12 is a 90 degree angle and so from 9 to 10 is a third of that or a 30 degree angle. Half of a 30 degree angle is a 15 degree angle so the class lasts half an hour.
    - I know that successive hours are 30 degree angles since there are 12 of them in the 360 degree circle. And two 15 degree angles make a 30 degree angle so this is half of an hour.

Aligned Standards

4.MD.C.5, 4.MD.C.7