

North Penn School District
Elementary Math Parent Letter

Grade 4

Unit 5 – Chapter 11: Angles

Examples for each lesson:

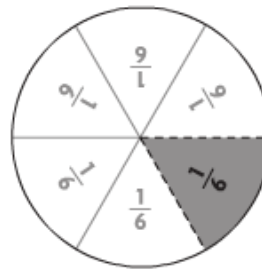
Lesson 11.1

Angles and Fractional Parts of a Circle

Find how many $\frac{1}{6}$ turns make a complete circle.

Materials: fraction circles

Step 1 Place a $\frac{1}{6}$ piece so the tip of the fraction piece is on the center of the circle. Trace the fraction piece by drawing along the dashed lines in the circle.



Step 2 Shade and label the angle formed by the $\frac{1}{6}$ piece.

Step 3 Place the $\frac{1}{6}$ piece on the shaded angle. Turn it clockwise (in the direction that the hands on a clock move). Turn the fraction piece to line up directly beside the shaded section.

Step 4 Trace the fraction piece. Shade and label it. You have traced 2 sixths in all.

Step 5 Repeat until you have shaded the entire circle.

There are six angles that come together in the center of the circle.

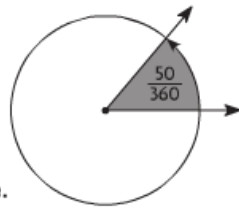
So, you need six $\frac{1}{6}$ turns to make a circle.

Lesson 11.2

Degrees

Angles are measured in units called **degrees**. The symbol for degrees is $^\circ$. If a circle is divided into 360 equal parts, then an angle that turns through 1 part of the 360 measures 1° .

An angle that turns through $\frac{50}{360}$ of a circle measures 50° .



Find the measure of an angle that turns through $\frac{1}{6}$ of a circle.

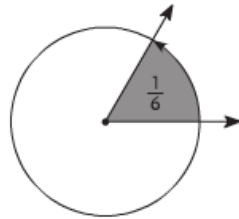
Step 1 Find a fraction that is equivalent to $\frac{1}{6}$ with 360 in the denominator. **Think:** $6 \times 60 = 360$.

$$\frac{1}{6} = \frac{1 \times 60}{6 \times 60} = \frac{60}{360}$$

Step 2 Look at the numerator of $\frac{60}{360}$.

The numerator tells how many degrees are in $\frac{1}{6}$ of a circle.

So, an angle that turns through $\frac{1}{6}$ of a circle measures 60° .



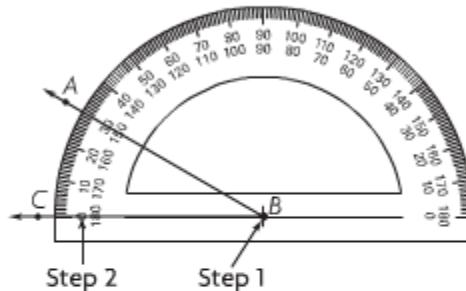
Lesson 11.3

Measure and Draw Angles

A **protractor** is a tool for measuring the size of an angle.

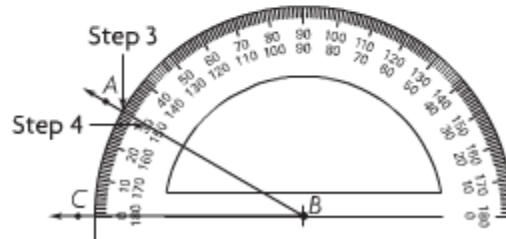
Follow the steps below to measure $\angle ABC$.

Step 1 Place the center point of the protractor on vertex B of the angle.



Step 2 Align the 0° mark on the protractor with ray BC . Note that the 0° mark is on the outer scale or top scale.

Step 3 Find where ray BA intersects the same scale.



Step 4 Read the angle measure on the scale.

The $m\angle ABC = \underline{30^\circ}$.

More information on this strategy is available on Animated Math Model #44.

Lesson 11.4

Join and Separate Angles

The measure of an angle equals the sum of the measures of its parts.

Use your protractor and the angles at the right.

Step 1 Measure $\angle ABC$ and $\angle CBD$. Record the measures.

$$m\angle ABC = \underline{35^\circ}; m\angle CBD = \underline{40^\circ}$$

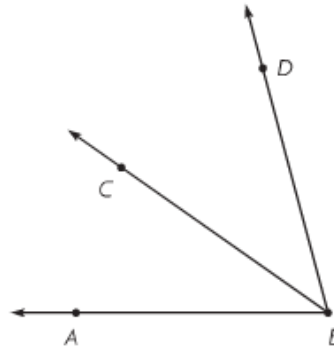
Step 2 Find the sum of the measures.

$$\underline{35^\circ} + \underline{40^\circ} = \underline{75^\circ}$$

Step 3 Measure $\angle ABD$. Record the measure.

$$m\angle ABD = \underline{75^\circ}$$

So, $m\angle ABC + m\angle CBD = m\angle ABD$.

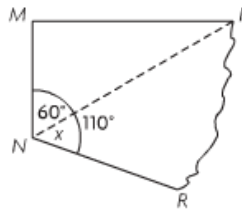


Lesson 11.5

Problem Solving • Unknown Angle Measures

Use the strategy *draw a diagram*.

Mrs. Allen is cutting a piece of wood for a set for the school play. She needs a piece of wood with a 60° angle. After the cut, what is the angle measure of the part left over?



Read the Problem								
What do I need to find?	What information do I need to use?	How will I use the information?						
I need to find <u>the angle measure of the part left over, or $m\angle PNR$</u> .	I can use <u>the angle measures I know:</u> <u>$m\angle MNP = 60^\circ$ and</u> <u>$m\angle MNR = 110^\circ$</u> .	I can <u>draw a bar model to find the unknown angle measure, or $m\angle PNR$</u> .						
Solve the Problem								
I can <u>draw a bar model to represent the problem</u> .								
Then I can <u>write an equation to solve the problem</u> .								
$m\angle MNP + m\angle PNR = m\angle MNR$ $\underline{60^\circ} + x = \underline{110^\circ}$ $x = \underline{110^\circ} - \underline{60^\circ}$, or $\underline{50^\circ}$								
<div style="display: flex; align-items: center; justify-content: center;"> <table border="1" style="margin-right: 20px;"> <tr> <td style="width: 50px; text-align: center;">60°</td> <td style="width: 50px; text-align: center;">x</td> </tr> <tr> <td colspan="2" style="text-align: center; border: none;"> <div style="border-top: 1px solid black; width: 100%;"></div> </td> </tr> <tr> <td colspan="2" style="text-align: center; border: none;">110°</td> </tr> </table> </div>			60°	x	<div style="border-top: 1px solid black; width: 100%;"></div>		110°	
60°	x							
<div style="border-top: 1px solid black; width: 100%;"></div>								
110°								
So, $m\angle PNR = \underline{50^\circ}$.								
The angle measure of the part left over is <u>50°</u> .								

Vocabulary

Clockwise – in the same direction in which the hands of a clock move

Counterclockwise – in the opposite direction in which the hands of a clock move

Degree (°) – the unit used for measuring angles

Protractor – a tool used for measuring the size of an angle

Acute angle – an angle that measure greater than 0° and less than 90°

Obtuse angle – an angle that measures greater than 90° and less than 180°

Ray – a part of a line; it has one endpoint and continues without end in one direction

Right angle – an angle that forms a square corner and has a measure of 90°

Vertex – the point at which two rays on an angle meet or two (or more) line segments meet in a two-dimensional shape