For the teacher's guide and all answers
please contact info@putterking.com

Future Kings™ Education Program

Subject: Math
Level 2 (Princess)

Putter King LLC
Level 28 Shinagawa Intercity Tower A
2-15-1 Konan Minato-ku Tokyo, Japan
〒108-6028

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Math

Level 2 - Princess

Summary

Area of focus: angles

Topics covered:

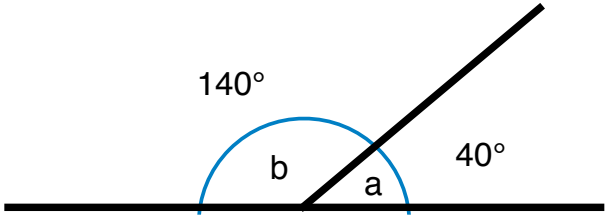
- Supplementary angles
- Complementary angles
- Congruent angles
- Adjacent angles
- Linear pairs
- Vertical angles
- Angle bisectors

Suggested time to complete (2 hrs):

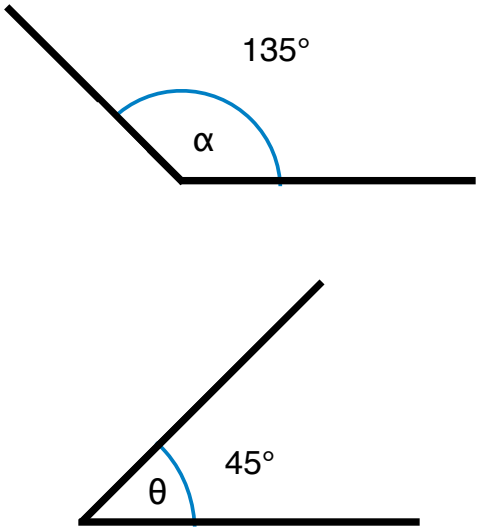
- Teaching material (40 minutes)
- Practice activity (20 minutes)
- Final project (60 minutes)

Supplementary Angles

Supplementary angles are two angles whose measures combined equal 180 degrees.



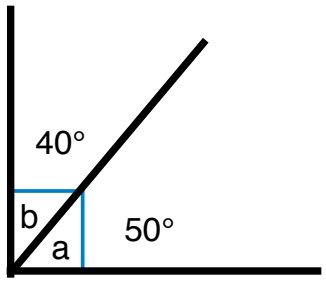
Angle **a** and angle **b** (40° and 140°) are supplementary angles, because they add up to 180°.



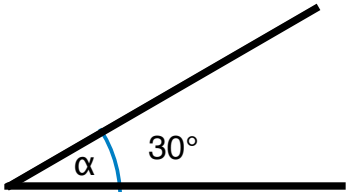
Angle α and angle θ (135° and 45°) are also supplementary angles, even though they are not connected together, because they add up to 180°.

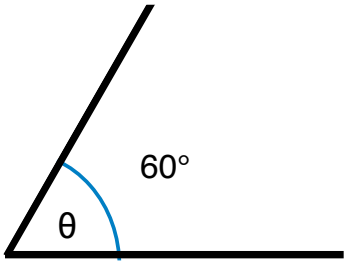
Complementary Angles

Complementary angles are two angles whose measures combined equal 90 degrees.



Angle **a** and angle **b** (50° and 40°) are complementary angles, because they add up to 90°.

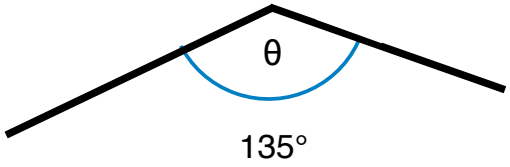


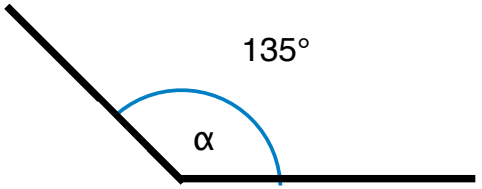


Angle α and angle θ (30° and 60°) are also complementary angles, even though they are not connected together, because they add up to 90°.

Congruent Angles

Congruent angles have the same angle (in degrees or radians).

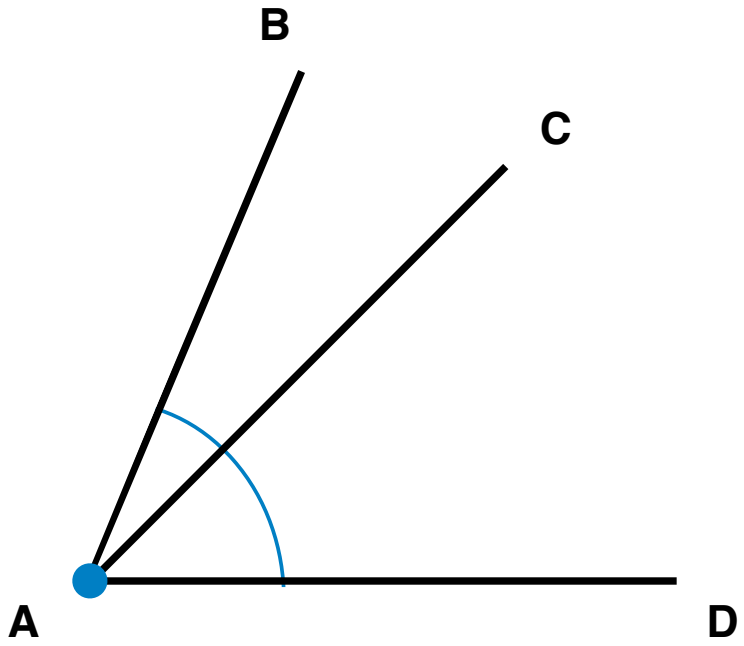




Angle θ and angle α are **congruent angles**. **Congruent angles** do not have to point in the same direction, they only need to have the same angle rotation (in degrees or radians).

Adjacent Angles

Two angles are **adjacent** if they have a common side and a common vertex.

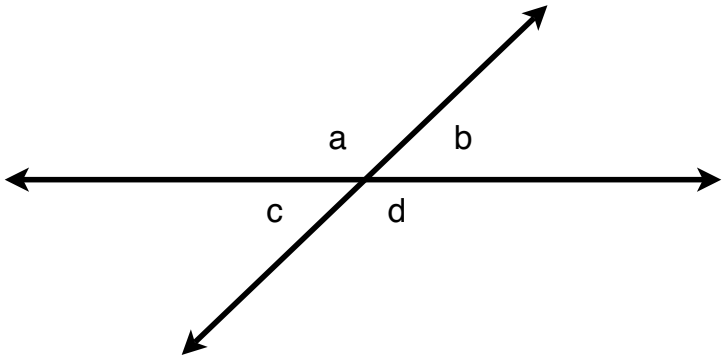


Angle BAC is **adjacent** to angle CAD because they have a common side (line AC) and they have a common vertex (point A)

Linear Pairs of Angles

Two angles form a **linear pair** if and only if:
- they are adjacent (have a common side) and
- their other sides are opposite rays

In other words, a **linear pair** of angles is formed when two lines intersect. Two angles are said to be linear pairs if they are both *adjacent* and *supplementary*.

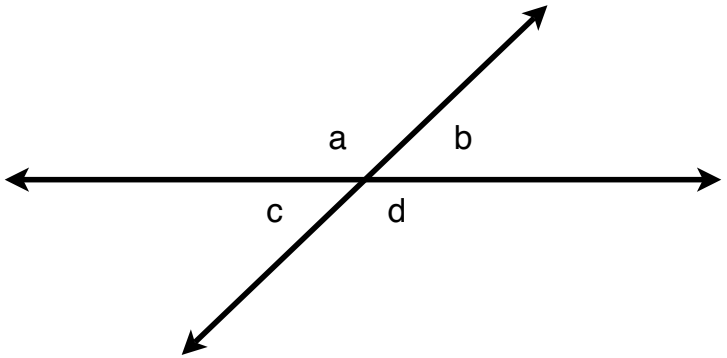


The following angles are **linear pairs**:
- angles a and b
- angles a and c
- angles b and d
- angles c and d

Vertical Angles

Vertical angles are the angles opposite each other when two lines cross.

In other words, **vertical angles** are a pair of non-adjacent angles formed by the intersection of two straight lines.

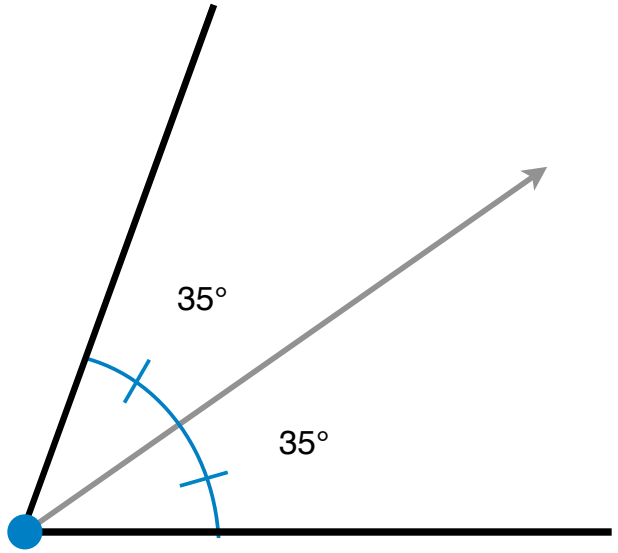


Vertical angles are always congruent, or of equal measure.

The following angles are **vertical angles**:
- angles a and d
- angles c and b

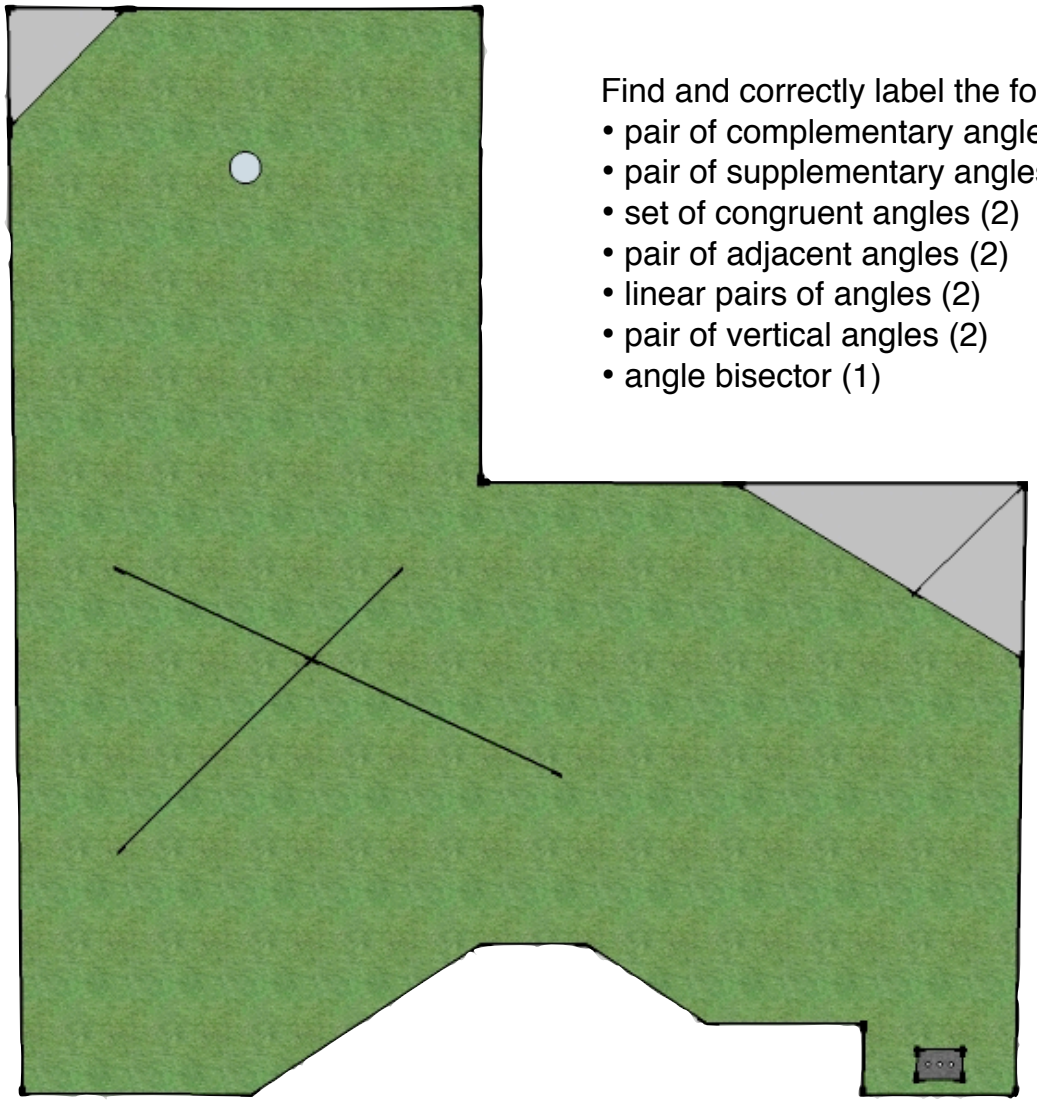
Angle Bisectors

An **angle bisector** is a line or line segment that divides an angle into two equal parts.



The two smaller angles are *adjacent angles*.

Practice Activity



Find and correctly label the following:

- pair of complementary angles (1)
- pair of supplementary angles (3)
- set of congruent angles (2)
- pair of adjacent angles (2)
- linear pairs of angles (2)
- pair of vertical angles (2)
- angle bisector (1)

Final Project

Requirements

Design and label a miniature golf hole that includes at least:

- 2 pairs of complementary angles
- 2 pairs of supplementary angles
- 2 congruent angles
- 2 pairs of adjacent angles
- 1 linear pair of angles
- 1 set of vertical angles

For full points, be sure to:

- draw and label at least one angle bisector (use a protractor to accurately draw the bisector)
- use a protractor to accurately measure and label the rotation amount for 1 pair of complementary angles and 1 pair of supplementary angles
- be creative!

Grading Rubric

	Bogey (70% - 79%)	Par (80% - 89%)	Birdie (90% - 100%)
Angles	• Student did not include all required angles • Student incorrectly measured more than one angle	• Student forgot to include a required angle • Student incorrectly measured an angle	• Student included all required angles • Student correctly measured at least one bisector and two angles (one pair of complementary angles and one pair of supplementary angles) using a protractor
Labels	• Student incorrectly labeled more than one angle • Student incorrectly labeled the degrees of rotation for at least one angle	• Student incorrectly labeled an angle • Student incorrectly labeled the degrees of rotation for one angle	• Student correctly labeled all angles • Student correctly labeled at least one bisector • Student correctly labeled the degrees of rotation for at least one pair of complementary angles and one pair of supplementary angles
Design	• Miniature golf hole design is plain and simple • Student lines and angles are sloppy or incorrectly labeled • Miniature golf hole design does not exhibit creativity	• Miniature golf hole design is playable • Student lines and angles are neatly drawn and labeled	• Miniature golf hole design is playable and aesthetically pleasing • Student lines and angles are neatly drawn and labeled • Miniature golf hole design is creative and original