

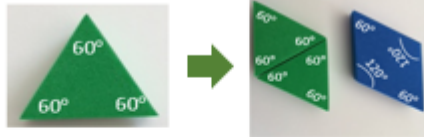
## Packet 14: Angles, Triangles, and Quadrilaterals

Dear Parents/Guardians,

Packet 14 introduces geometric measurement. In lesson 1, students review polygons while investigating angle relationships. In lesson 2, students explore 'special' angle relationships and use them to find missing angle measures. In lesson 3, students draw figures with given characteristics, both freehand and with tools.

### Angle Relationships

In Lesson 1, students explore angle relationships with pattern blocks.



The three interior angles of a triangle always add up to  $180^\circ$ .

The interior angles on an equilateral triangle are congruent (have the same measure).

$$180^\circ \div 3 = 60^\circ$$

Using the angle measures of the triangle students can find angle measures within each polygon.

Students use a protractor to measure and draw angles. For additional support with protractors, please click the video links in Additional Resources.

### 'Special Angle' Relationships

Students use angle relationships to solve for missing angles.

|                                                                                                  |                                                                                                                                    |
|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>adjacent angles</b></p> <p>Share a common vertex and common side.</p>                      | <p><b>vertical angles</b></p> <p>Opposite angles formed by two lines that intersect at a point. Vertical angles are congruent.</p> |
| <p><b>complementary angles</b></p> <p>Angles whose measures add up to <math>90^\circ</math>.</p> | <p><b>supplementary angles</b></p> <p>Angles whose measures add up to <math>180^\circ</math>.</p>                                  |

Complementary and supplementary angles do not have to be adjacent.

### Solving for the Missing Angle Measures

Students write and solve equations involving angle measures.

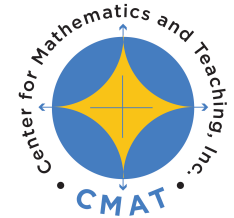
Since the three angles lie on a line, they are supplementary and add up to  $180^\circ$ .

Students write and solve equations to find the value of  $p$ .

| Algebra                          | Reasoning                   |
|----------------------------------|-----------------------------|
| $(2p + 4) + 72 + (3p - 6) = 180$ | Supplementary angles        |
| $5p + 70 = 180$                  | Combine like terms          |
| $5p = 110$                       | Subtract 70 from both sides |
| $p = 22$                         | Divide both sides by 5      |

Students substitute  $p = 22^\circ$  to find the missing angle measures.

|                     |                     |
|---------------------|---------------------|
| $2p + 4$            | $3p - 6$            |
| $2(22) + 4$         | $3(22) - 6$         |
| $44 + 4 = 48^\circ$ | $66 - 6 = 60^\circ$ |



**By the end of the packet, your student should know...**

How to measure and draw angles using a protractor  
Lesson 14.1

How to write and solve equations to find missing angle measures  
Lessons 14.1 and 14.2

Facts about angles to solve problems  
Lesson 14.2

How to draw and construct geometric figures freehand, and with rulers and protractors  
Lesson 14.3

### Additional Resources

Resource Guide (RG)  
Part 2, pages 48-52

Measuring with a protractor:  
<http://youtu.be/2T-8v3D99KI>  
<http://youtu.be/LiHutbul6FM>