Lesson 30: One-Step Problems in the Real World

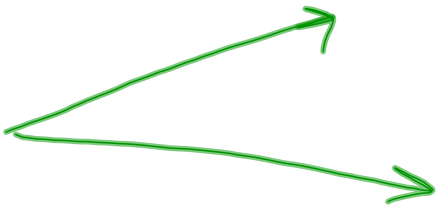
Student Outcomes

- Students calculate missing angle measures by writing and solving equations.

Opening Exercise

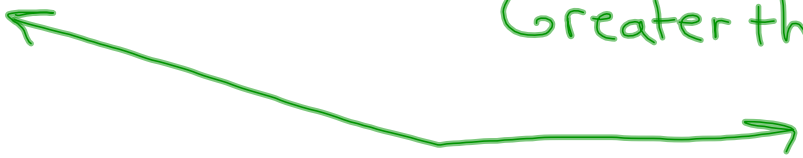
Draw an example of each term and write a brief description.

Acute



Smaller than 90°

Obtuse



Greater than 90°

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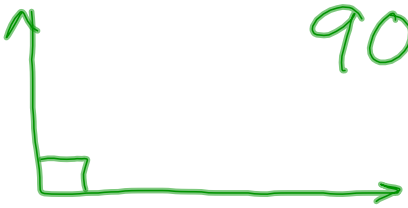
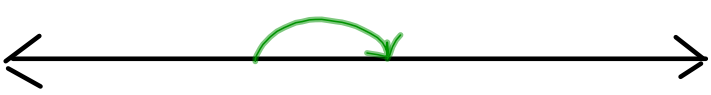
Right



90° Angle

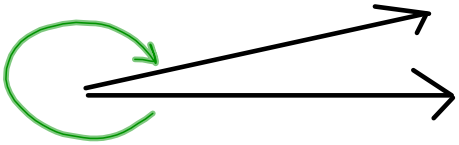
Straight

Measures 180°



Between 180° & 360°

Reflex



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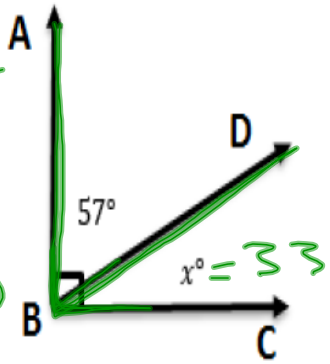
Example 1

$\angle ABC$ measures 90°. The angle has been separated into two angles. If one angle measures 57°, what is the measure of the other angle?

How are these two angles related?

The sum of the angles is 90°



What equation could we use to solve for x.

$x + 57 = 90°$

$x + 57 - 57 = 90 - 57$

$x = 33°$

$57 + 33 = 90$

Now let's solve.

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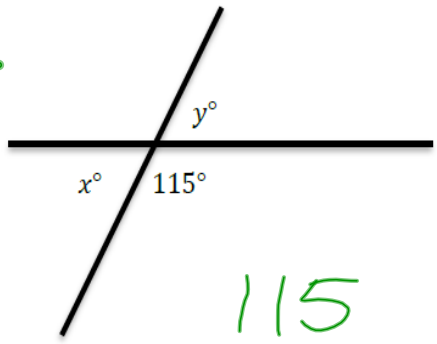
Example 2

Michelle is designing a parking lot. She has determined that one of the angels should be 115°. What is the measure of angle x and angle y?

How is angle x related to the 115° angle?

The sum of the angles is 180°



What equation would we use to show this?

$x + 115 = 180$

$x + 115 - 115 = 180 - 115$

How would you solve this equation?

$x = 65°$

$115 + 65 = 180°$

How is angle y related the angle that measures 115° ?

The sum of the angles is 180° therefore $y = 65°$

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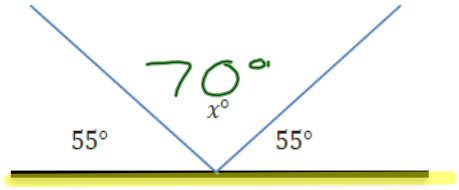
Example 3

A beam of light is reflected off of a mirror. Below is a diagram of the reflected beam. Determine the missing angle measure.



55
55
+70
180°

How are the angles in this question related?

The sum of the angles is 180°

What equation could we write to represent the situation?

$x + 55 + 55 = 180$

$x + 110 = 180$

How would you solve an equation like this?

$x + 110 - 110 = 180 - 110$

$x = 70°$

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Exercises

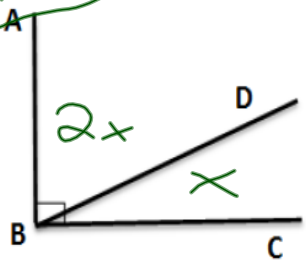
Write and solve an equation in each of the problems.

1. $< ABC$ measures 90°. It has been split into two angles, $< ABD$ and $< DBC$. The measure of the two angles is in a ratio of 2:1. What are the measures of each angle?

2 : 1

2x : x

One angle is 30° & the other is 60°



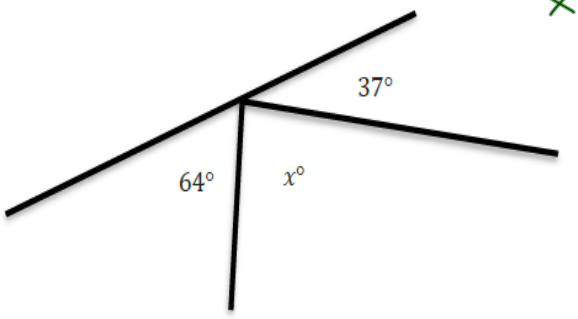
$2x + x = 90$

$3x = 90$

$x \cdot 3 \div 3 = 90 \div 3$

$x = 30$

2. Solve for x.



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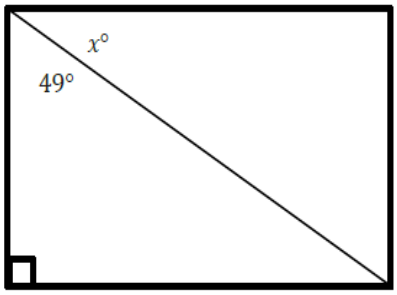
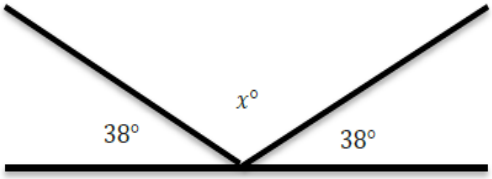
3. Candice is building a rectangular piece of fence according to the plans her boss gave her. One of the angles is not labeled. Write an equation and use it to determine the measure of the unknown angle.



4. Rashid hit a hockey puck against the wall at a 38° angle. The puck hit the wall and traveled in a new direction. Determine the missing angle in the diagram.



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5. Jaxon is creating a mosaic design on a rectangular table. He has added two pieces to one of the corners. The first piece has an angle measuring 38° that is placed in the corner. A second piece has an angle measuring 27° that is also placed in the corner. Draw a diagram to model the situation. Then, write an equation and use it to determine the measure of the unknown angle in a third piece that could be added to the corner of the table.

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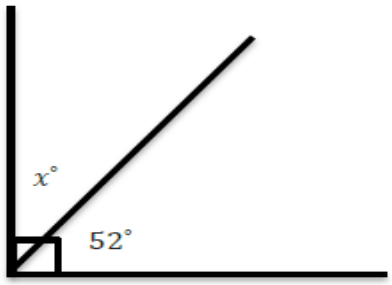
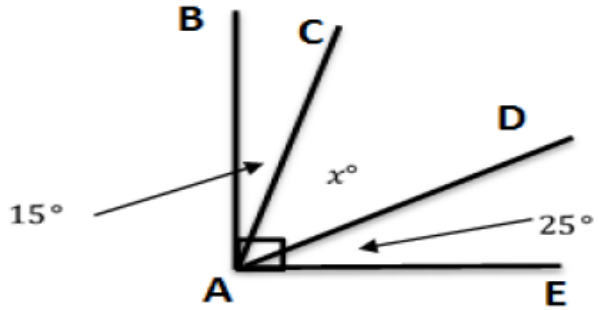
Problem Set

1. Solve for x.



2. $< BAE$ measures 90°. Solve for x.



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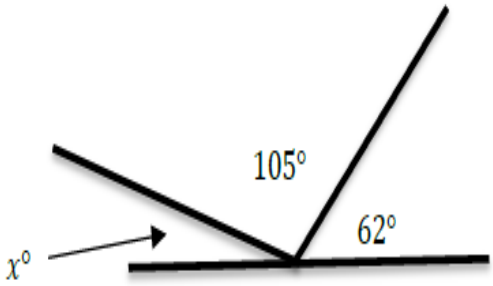
3. Thomas is putting in a tile floor. He needs to determine the angles that should be cut in the tiles to fit in the corner. The angle in the corner measures 90°. One piece of the tile will have a measure of 24°. Write an equation and use it to determine the measure of the unknown angle.

4. Solve for x.



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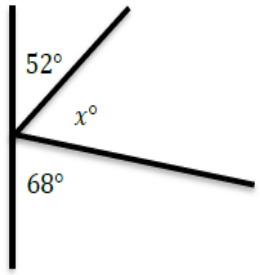
5. Aram has been studying the mathematics behind pinball machines. He made the following diagram of one of his observations. Determine the measure of the missing angle.



6. The measures of two angles have a sum of 90°. The measures of the angles are in a ratio of 2: 1. Determine the measures of both angles.

7. The measures of two angles have a sum of 180°. The measures of the angles are in a ratio of 5: 1. Determine the measures of both angles.

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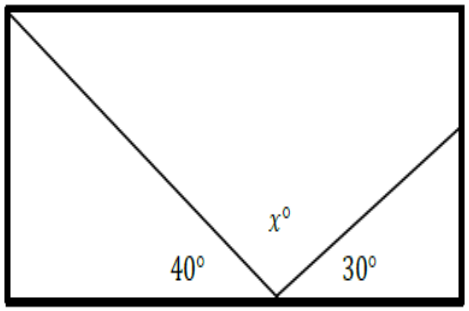
Exit Ticket

Write an equation and solve for the missing angle in each question.

1. Alejandro is repairing a stained glass window. He needs to take it apart to repair it. Before taking it apart he makes a sketch with angle measures to put it back together.

   Write an equation and use it to determine the measure of the unknown angle.



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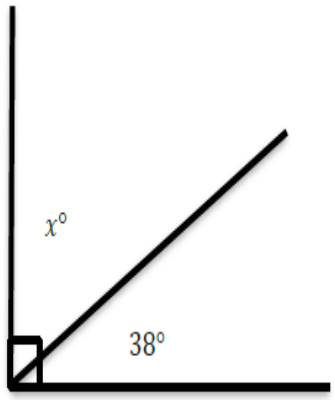
2. Hannah is putting in a tile floor. She needs to determine the angles that should be cut in the tiles to fit in the corner. The angle in the corner measures 90°. One piece of the tile will have a measure of 38°. Write an equation and use it to determine the measure of the unknown angle.



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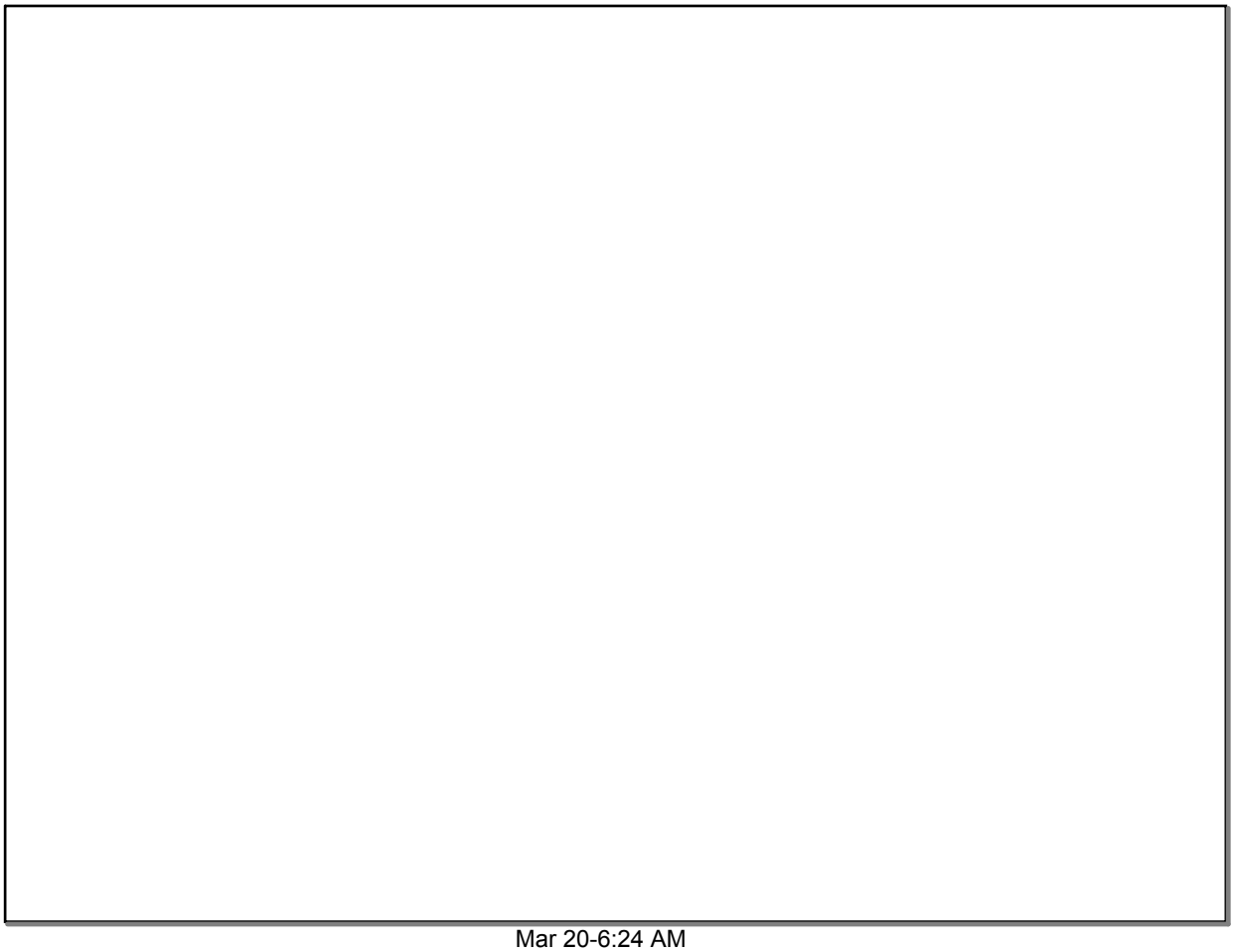

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