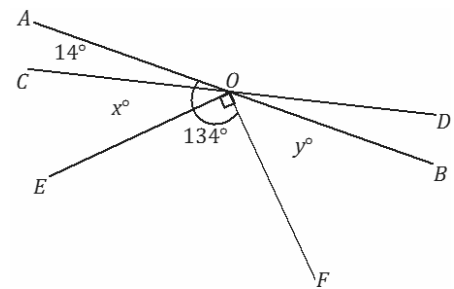


Lesson 3: Solving for Unknown Angles Using Equations

Classwork

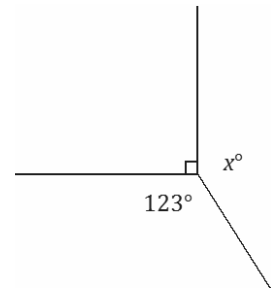
Opening Exercise

Two lines meet at a point that is also the vertex of an angle; the measurement of $\angle AOF$ is 134° . Set up and solve an equation to find the values of x and y . Are your answers reasonable? How do you know?



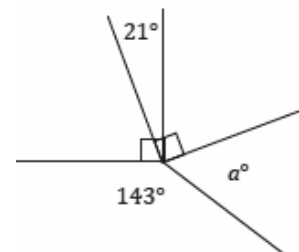
Example 1

Set up and solve an equation to find the value of x .



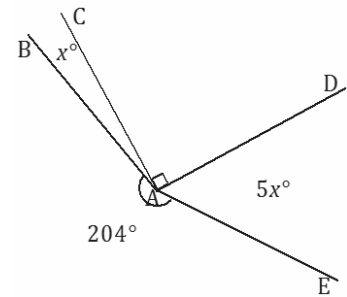
Exercise 1

Five rays meet at a common endpoint. In a complete sentence, describe the relevant angle relationships in the diagram. Set up and solve an equation to find the value of a .

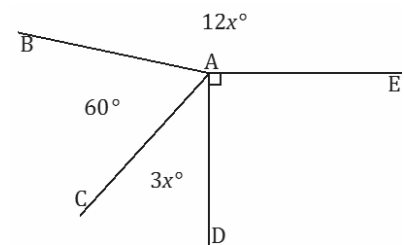


Example 2

Four rays meet at a common endpoint. In a complete sentence, describe the relevant angle relationships in the diagram. Set up and solve an equation to find the value of x . Find the measurements of $\angle BAC$ and $\angle DAE$.

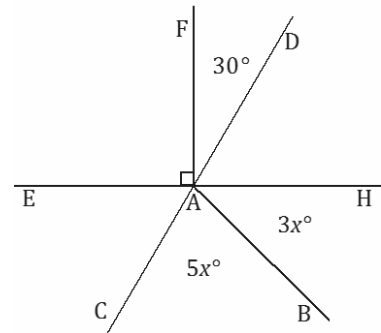
**Exercise 2**

Four rays meet at a common endpoint. In a complete sentence, describe the relevant angle relationships in the diagram. Set up and solve an equation to find the value of x . Find the measurement of $\angle CAD$.

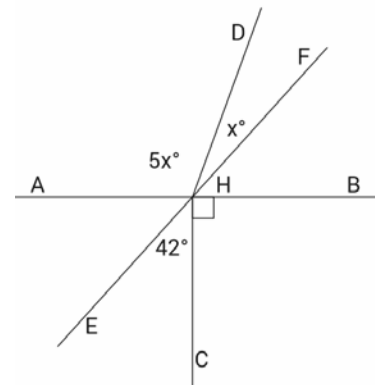


Example 3

Two lines meet at a point that is also the endpoint of two rays. In a complete sentence, describe the relevant angle relationships in the diagram. Set up and solve an equation to find the value of x . Find the measurements of $\angle BAC$ and $\angle BAH$.

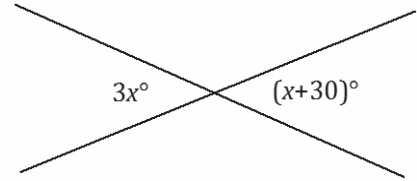
**Exercise 3**

Lines AB and EF meet at a point which is also the endpoint of two rays. In a complete sentence, describe the relevant angle relationships in the diagram. Set up and solve an equation to find the value of x . Find the measurements of $\angle DHF$ and $\angle AHD$.

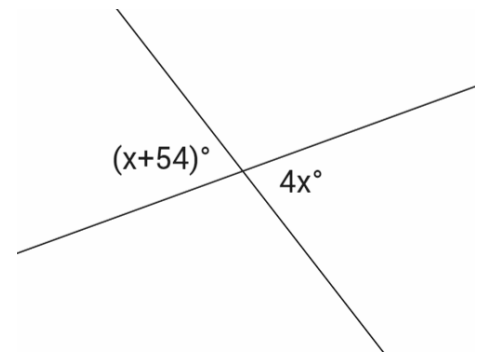


Example 4

Two lines meet at a point. Set up and solve an equation to find the value of x . Find the measurement of one of the vertical angles.

**Exercise 4**

Set up and solve an equation to find the value of x . Find the measurement of one of the vertical angles.



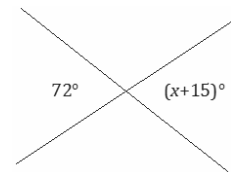
Lesson Summary

Steps to Solving for Unknown Angles

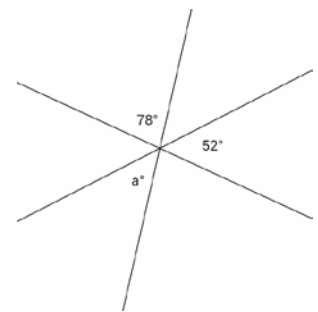
- Identify the angle relationship(s).
- Set up an equation that will yield the unknown value.
- Solve the equation for the unknown value.
- Substitute the answer to determine the angle(s).
- Check and verify your answer by measuring the angle with a protractor.

Problem Set

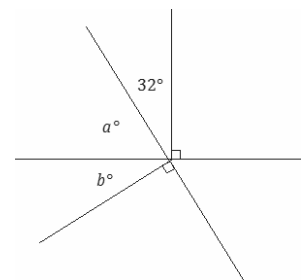
1. Two lines meet at a point. Set up and solve an equation to find the value of x .



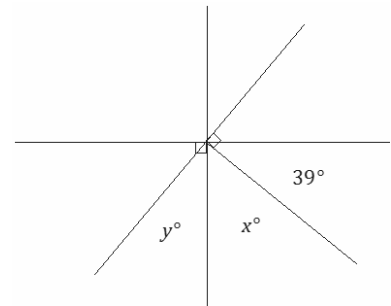
2. Three lines meet at a point. Set up and solve an equation to find the value of a . Is your answer reasonable? Explain how you know.



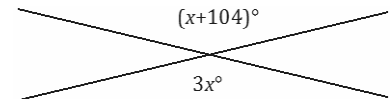
3. Two lines meet at a point that is also the endpoint of two rays. Set up and solve an equation to find the values of a and b .



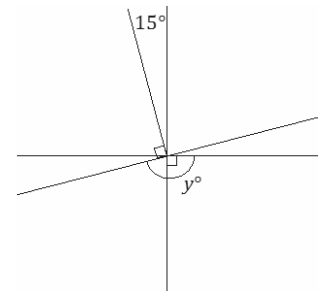
4. Three lines meet at a point that is also the endpoint of a ray. Set up and solve an equation to find the values of x and y .



5. Two lines meet at a point. Find the measurement of one of the vertical angles. Is your answer reasonable? Explain how you know.



6. Three lines meet at a point that is also the endpoint of a ray. Set up and solve an equation to find the value of y .



7. Three adjacent angles are at a point. The second angle is 20° more than the first, and the third angle is 20° more than the second angle.
- Find the measurements of all three angles.
 - Compare the expressions you used for the three angles and their combined expression. Explain how they are equal and how they reveal different information about this situation.
8. Four adjacent angles are on a line. The measurements of the four angles are four consecutive even numbers. Determine the measurements of all four angles.
9. Three adjacent angles are at a point. The ratio of the measurement of the second angle to the measurement of the first angle is 4:3. The ratio of the measurement of the third angle to the measurement of the second angle is 5:4. Determine the measurements of all three angles.

10. Four lines meet at a point. Solve for x and y in the following diagram.

