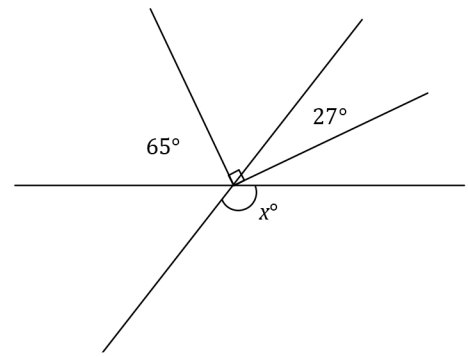
# Solving for Unknown Angles Using Equations

Set up and solve an equation to find the value of . Explain why your answer is reasonable.

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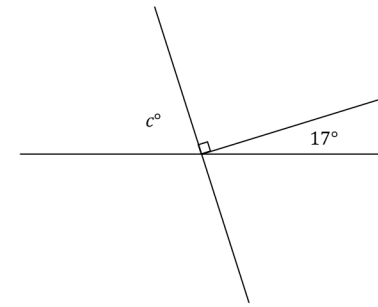
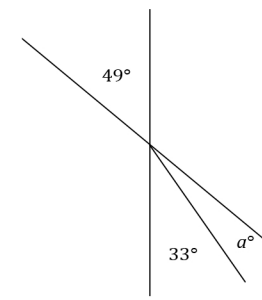
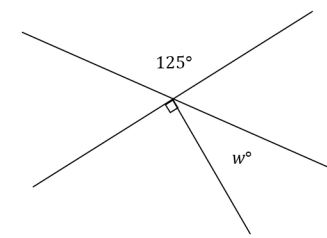
1. Two lines meet at the vertex of a ray. Set up and solve an equation to find the value of .



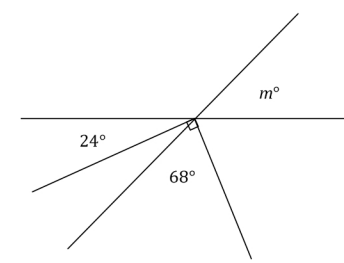

2. Two lines meet at the vertex of a ray. Set up and solve an equation to find the value of . Explain why your answer is reasonable.



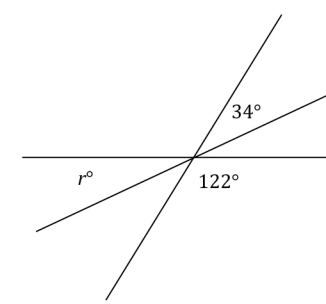

3. Two lines meet at the vertex of a ray. Set up and solve an equation to find the value of .




4. Two lines meet at the common vertex of two rays. Set up and solve an equation to find the value of .




5. Three lines meet at a point. Set up and solve an equation to find the value of .

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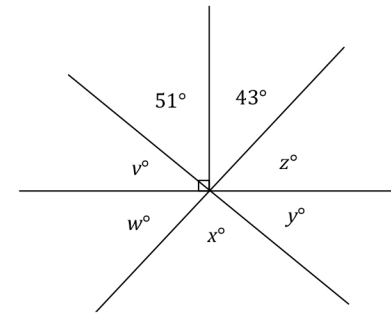
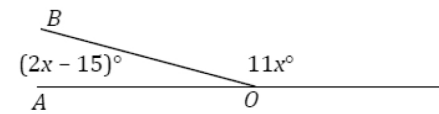
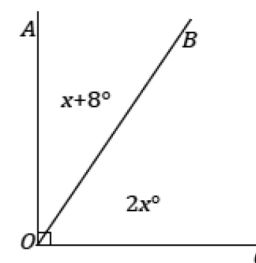
6. Three lines meet at the vertex of a ray. Set up and solve an equation to find the value of each variable in the diagram.



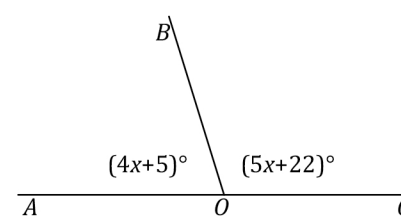

7. Set up and solve an equation to find the value of . Find the measurement of and of .



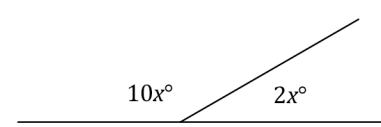

8. Set up and solve an equation to find the value of . Find the measurement of and of .




9. Set up and solve an equation to find the value of . Find the measurement of and of .




10. Write a verbal problem that models the following diagram. Then solve for the two angles.

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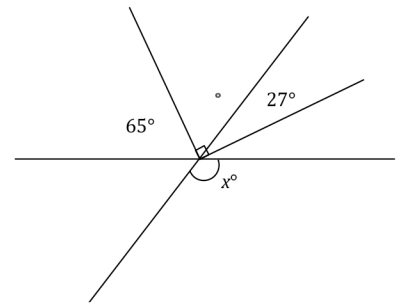
**Set up and solve an equation to find the value of . Explain why your answer is reasonable.**

*There are multiple solutions to the problem. Two possible solutions are shown below.*

*or*



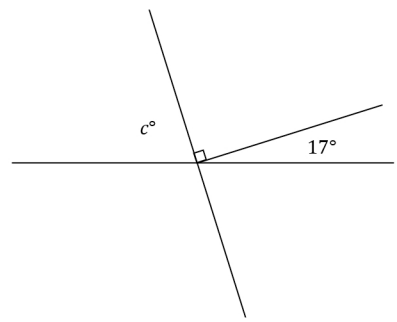

*The answers seem reasonable because a rounded value of as and a rounded value of its adjacent angle as , yields a sum of , which is close to the calculated answer.*

*Scaffolding:*

Students struggling to organize their solution may benefit from prompts such as the following: Write an equation to model this situation. Explain how your equation describes the situation. Solve and interpret the solution. Is it reasonable?

1. **Two lines meet at the vertex of a ray. Set up and solve an equation to find the value of .**

*on a line*




*Scaffolded solutions:*

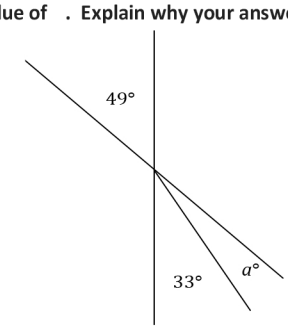
*a. Use equation above.*

*b. The angle marked , the right angle, and the angle with measurement are angles on a line and their measurements sum to .*

*c. Use solution above. The answer seems reasonable because it looks like it has a measurement a little lesson than a angle.*

2. **Two lines meet at the vertex of a ray. Set up and solve an equation to find the value of . Explain why your answer is reasonable.**

*add and vert*




*The answers seem reasonable because a rounded value of as and a rounded value of its adjacent angle as , yields a sum of , which is close to the rounded value of the measurement of the vertical angle.*

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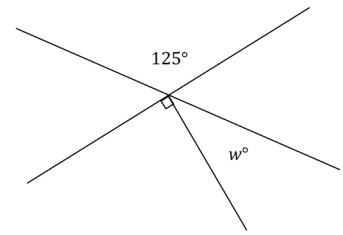
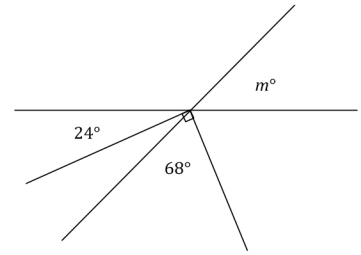
**3.** **Two lines meet at the vertex of a ray. Set up and solve an equation to find the value of .**



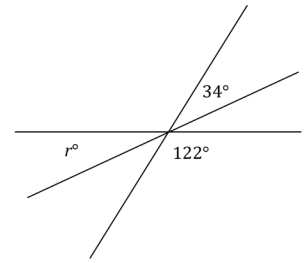

*add and vert*

**4.** **Two lines meet at the common vertex of two rays. Set up and solve an equation to find the value of .**




*add and vert*

**5.** **Three lines meet at a point. Set up and solve an equation to find the value of .**

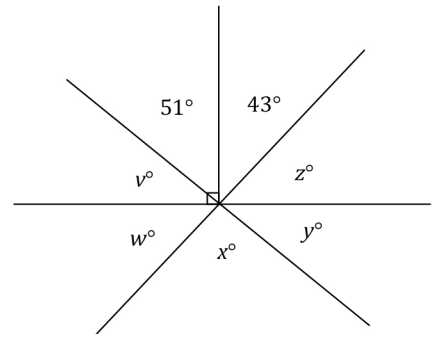



*on a line and vert*

**6.** **Three lines meet at the vertex of a ray. Set up and solve an equation to find the value of each variable in the diagram.**

*complementary*

*on a line*




*vert*

*vert*

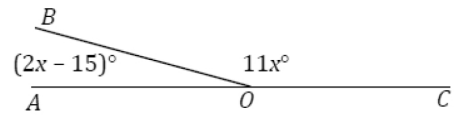
*vert*

**7.** **Set up and solve an equation to find the value of . Find the measurement of and of .**

*Scaffolding:*

Students struggling to organize their solution may benefit from prompts such as the following:

- Write an equation to model this situation. Explain how your equation describes the situation. Solve and interpret the solution. Is it reasonable?




*supplementary*

*The measurement of*
*The measurement of*

*Scaffolded solutions:*

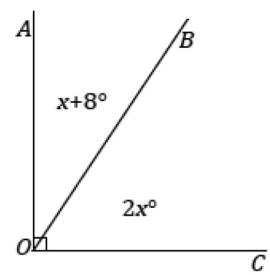
*a. Use equation above.*

*b. The marked angles are angles on a line and their measurements sum to .*

*c. The answers seem reasonable because once is substituted, the respective angle measurements seem appropriate since is acute and is obtuse.*

**8. Set up and solve an equation to find the value of . Find the measurement of and of .**

*complementary*

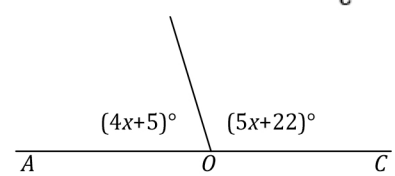



*The measurement of – –*

*The measurement of – –*

**9. Set up and solve an equation to find the value of . Find the measurement of**

*on a line*

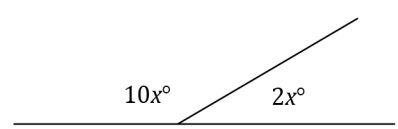



*The measurement of*

*The measurement of*

**10. Write a verbal problem that models the following diagram. Then solve for the two angles.**

*One possible response: Two angles are supplementary. The measurement of one angle is five times the other. Find the measurements of both angles.*




*on a line*

*The measurement of Angle 1:*

*The measurement of Angle 2:*

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