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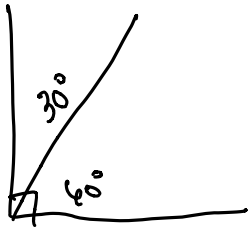
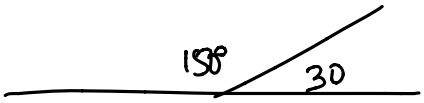
LEARNING OBJECTIVE: We will find missing angle measurements involving complementary, supplementary, vertical and adjacent angles. (G7M6L2)

ACTIVATING PRIOR KNOWLEDGE

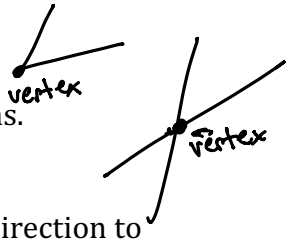
We know the difference between complementary and supplementary angles.

Draw a pair of complementary angles below where one angle is approximately 60^o.	Draw a pair of supplementary angles below where one angle is approximately 30^o.
	

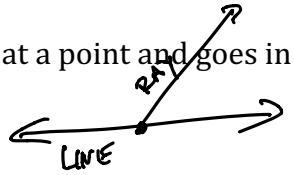
CONCEPT DEVELOPMENT

A few definitions (some new, some review) to help with word problems.

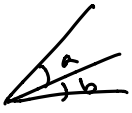
Vertex: The point where lines cross is called the vertex.



Ray: A portion of a line that begins at a point and goes in a particular direction to infinity.



Adjacent angles: Two angles that share a common ray.



Vertical (opposite) angles: Non adjacent angles formed when two lines intersect.

Angle measurements of opposite ∠'s are equal

Complementary angles: Two angles that add up to 90° are complementary.

Perpendicular: Lines that are at right angles to each other are perpendicular. Perpendicular lines form 90° angles (right angles).

Supplementary angles: Two angles that add up to 180° are supplementary

Angles on a Line: Two or more angles that add up to 180°.

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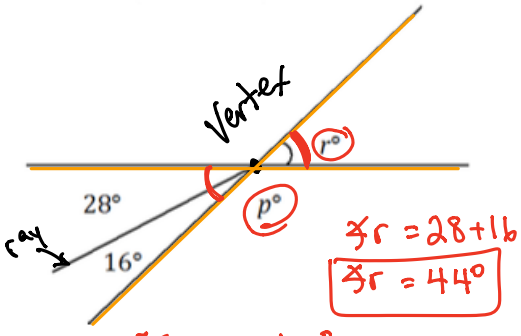
GUIDED PRACTICE

Steps for Finding Missing Angle Measurements Using Equations

1. Read the question carefully. As needed, use definitions on page 1 to help understand the angle relationships in the word problem.
2. Determine which angle measurement you are trying to find and define your variable.
3. Use your knowledge of angle relationships to find the value of the missing angle using equations.

HINT: Many times, the angles will equal 90° *or* 180°. Sometimes, the angles will be opposite, and they will equal each other.

Two lines meet at the vertex of a ray. Find the measurements of angles *p* and *r* in the diagram.



$\angle r = 28 + 16$

$\angle r = 44°$

$\angle r + \angle p = 180°$

$44 + \angle p = 180$

$-44 \quad -44$

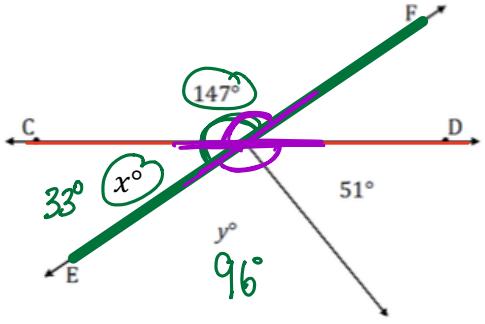
$\angle p = 136°$

Two lines meet at the vertex of a ray. Find the measurements of angles *x* and *y* in the diagram.

$180 - 147 = 33$

$x = 33°$

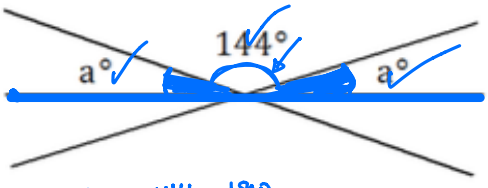
$147 - 51 = 96°$



$33 + y + 51 = 180$

$y = 96°$

Three lines meet at a point as shown in the diagram below. Find the measurement of angle *a*.



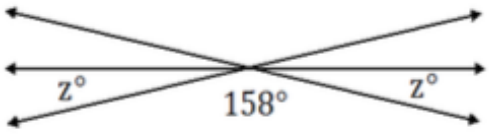
$2a + 144 = 180$

$-144 \quad -144$

$\frac{2a}{2} = \frac{36}{2}$

$a = 18°$

Three lines meet at a point as shown in the diagram below. Find the measurement of angle *z*.



$180 - 158 = \frac{22}{2} = 11$

$2z + 158 = 180$

$-158 \quad -158$

$\frac{2z}{2} = \frac{22}{2}$ $z = 11$

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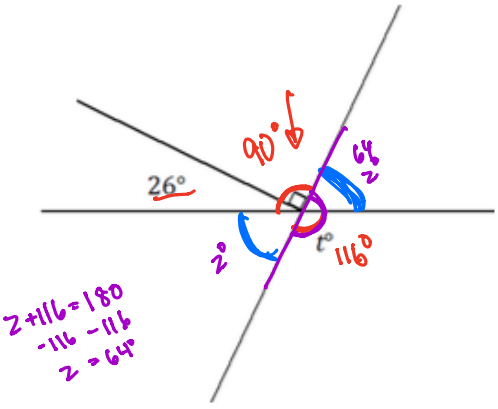
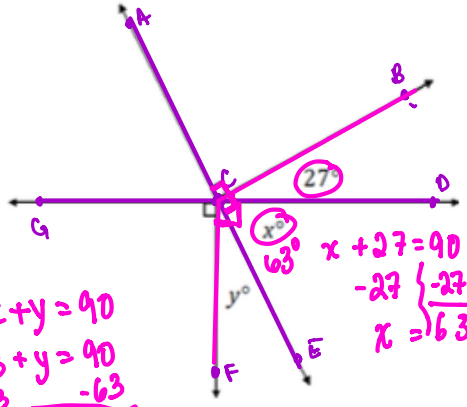
Two lines meet at the vertex of a ray. The ray is perpendicular to one of the lines as shown. Find the measurement of angle *t*.



$z + 116 = 180$
$-116 \quad -116$
$z = 64°$

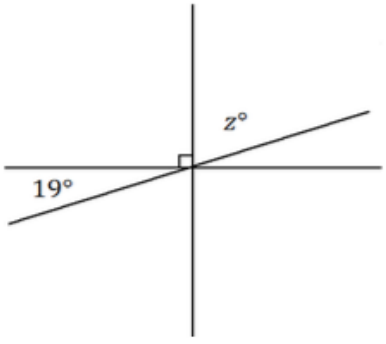
Two lines cross at a point, and two other rays meet at the vertex. Each ray is perpendicular to one of the lines as shown. Find the measurements of angles *x* and *y*.



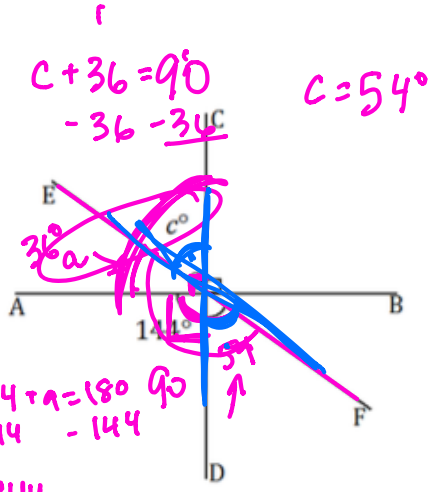
$x + y = 90$
$63 + y = 90$
$-63 \quad -63$
$y = 27°$

$x + 27 = 90$
$-27 \quad -27$
$x = 63$

Three lines meet at a point as shown below. Find the measurement of angle *z*.



Three lines meet at a point as shown below. Find the measurement of angle *c*.



$c + 36 = 90$
$-36 \quad -36$
$c = 54°$

$144 + a = 180$
$-144 \quad -144$

$144 - 90 = 54$

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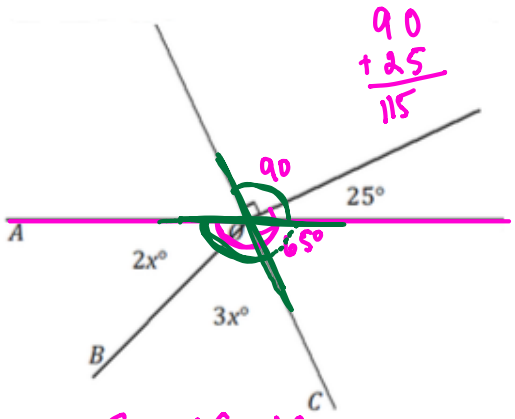
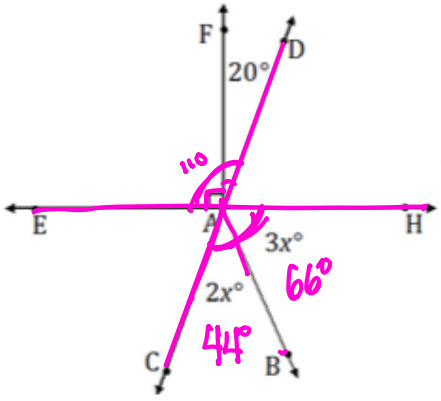
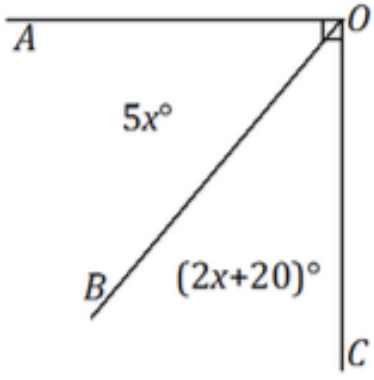
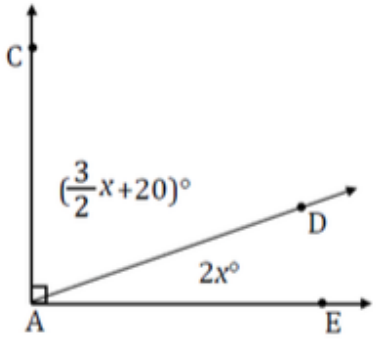
Two lines meet at the common vertex of two rays. Find the value of x and find the value of $\angle AOB$ and $\angle BOC$.  90 +25 115 5x+65=180 -65 -65 5x = 115	Two lines meet at the common vertex of two rays. Find the value of x and find the value of $\angle CAB$ and $\angle BAH$.  66° 44° 5x = 110 5 5 x = 22
Set up an equation to find the value of x and find the measurements of $\angle AOB$ and $\angle BOC$.  	Set up an equation and find the value of x and find the measurements of $\angle CAD$ and $\angle DAE$. 

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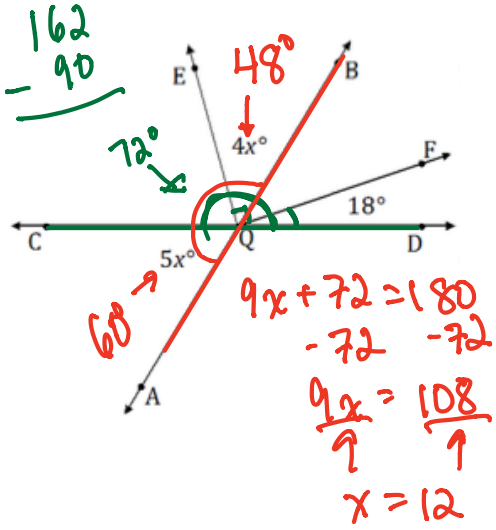
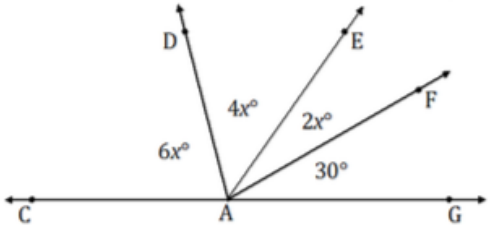
INDEPENDENT PRACTICE

Find the missing angle measurements.

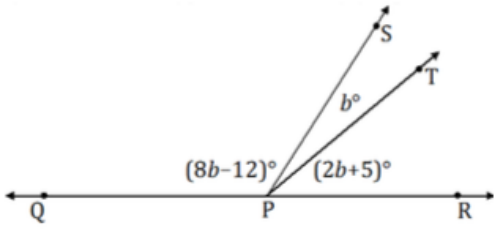
Find x and the angle measurements of $\angle CQA$ and $\angle EQB$.



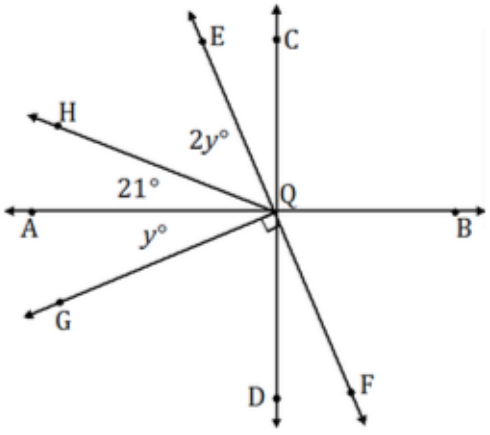
Find x and the angle measurements of $\angle CAD, \angle DAE$ and $\angle EAF$.



Find b and the angle measurements of $\angle QPS, \angle SPT$ and $\angle TPR$.



Find y and the angle measurements of $\angle HQE$ and $\angle AQG$.



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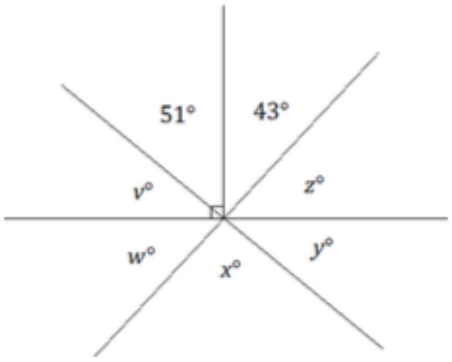
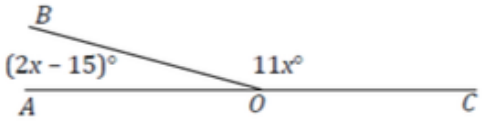
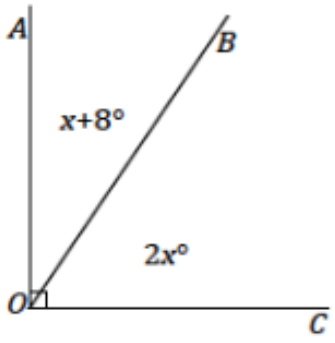
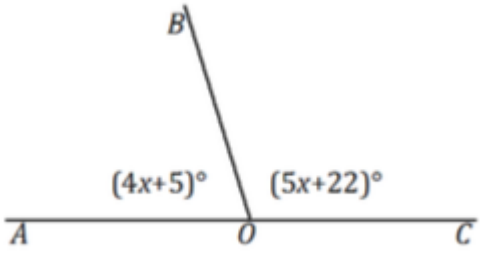
Find the missing angle measures.  	Find x and the angle measurements of $\angle AOB$ and $\angle BOC$. 
Find x and the angle measurements of $\angle AOB$ and $\angle BOC$.  	Find x and the angle measurements of $\angle AOB$ and $\angle BOC$. 

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CLOSURE

Exit ticket Lesson 2.

NOTES

This maps to Lesson 2 from Module 6 Grade 7. Also borrows some items from Module 3, lessons 10 and 11. Independent Practice could be homework.

Emphasize writing sentences and equations.