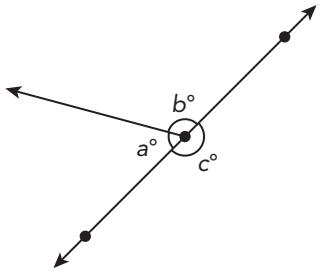
Name: _____ Date: _____

Use ratios to find angle measures in a diagram.

Example

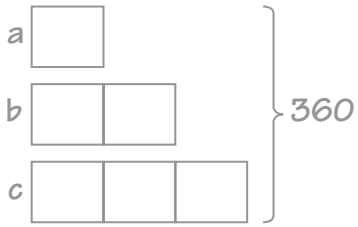
In the diagram below, the ratio $a : b : c = 1 : 2 : 3$. Find the values of a, b, and c.



Method 1

Draw a bar model.

$a° + b° + c° = 360°$



From the bar model,

$6 \text{ units} \rightarrow 360$

$1 \text{ unit} \rightarrow \frac{360}{6} = 60$

$a = 60$

$b = 2 \cdot 60 = 120$

$c = 3 \cdot 60 = 180$

Method 2

Use a variable to represent the measure of the angle.

The ratio $a : b : c = 1 : 2 : 3$. So, $b = 2 \cdot a$ and $c = 3 \cdot a$.

$a° + b° + c° = 360°$	∠s at a point
$a + 2a + 3a = 360$	Substitute.
$6a = 360$	Simplify.
$\frac{6a}{6} = \frac{360}{6}$	Divide both sides by 6.
$a = 60$	Simplify.

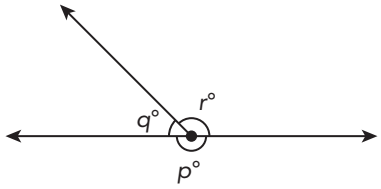
$b = 2 \cdot a$
$= 2 \cdot 60$
$= 120$

$c = 3 \cdot a$
$= 3 \cdot 60$
$= 180$

Name: _____ Date: _____

Complete.

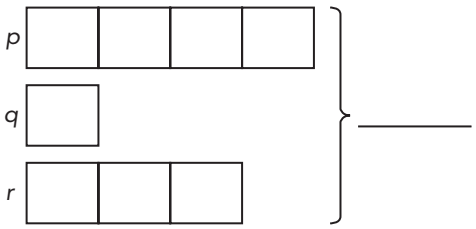
9. In the diagram below, the ratio $p : q : r = 4 : 1 : 3$. Find the values of p, q, and r.



Method 1

Draw a bar model.

$p° + q + r°$ = _____



From the bar model,

_____ units → _____

1 unit → _____ = _____

$p = 4 \cdot$ _____ = _____

q = _____

$r = 3 \cdot$ _____ = _____

Method 2

Use a variable to represent the measure of the angle.

The ratio $p : q : r = 4 : 1 : 3$. So, $p = 4 \cdot q$ and $r = 3 \cdot q$.

$p° + q° + r°$ = _____	∠s at a point
_____ + _____ + _____ = _____	Substitute.
_____ = _____	Simplify.
_____ = _____	Divide both sides by 8.
q = _____	Simplify.

$p = 4 \cdot q$ $\quad$ $r = 3 \cdot q$

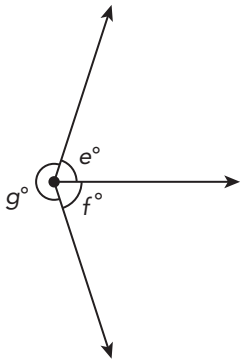
$= 4 \cdot$ _____ $\quad$ $= 3 \cdot$ _____

$=$ _____ $\quad$ $=$ _____

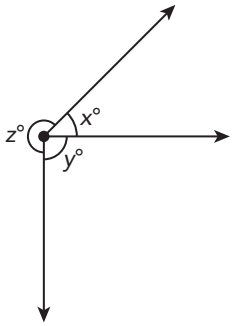
Name: _____ Date: _____

Find the value of each variable.

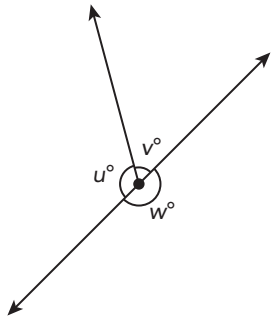
10. In the diagram below, the ratio $e : f : g = 1 : 1 : 3$.



11. In the diagram below, the ratio $x : y : z = 1 : 2 : 5$.



12. In the diagram below, the ratio $u : v : w = 2 : 1 : 3$.

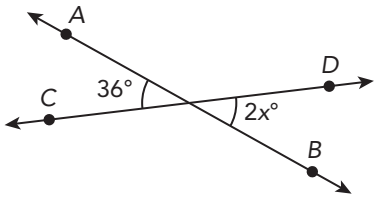


Name: _____ Date: _____

Use algebra and vertical angles to find the value of each variable.

Example

$\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are straight lines. Find the value of x.



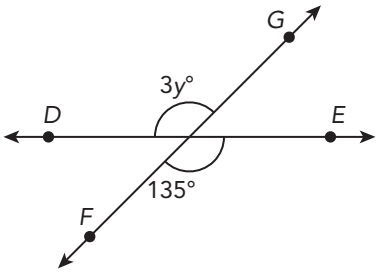
$2x° = 36°$ Vert. ∠s

$\frac{2x}{2} = \frac{36}{2}$ Divide both sides by 2.

$x = 18$ Simplify.

Complete.

13. $\overleftrightarrow{DE}$ and $\overleftrightarrow{FG}$ are straight lines. Find the value of y.



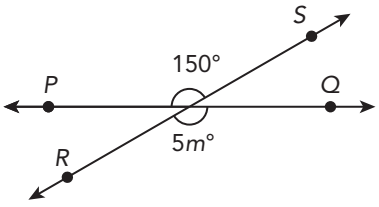
$3y° =$ _____ Vert. ∠s

_____ = _____ Divide both sides by _____.

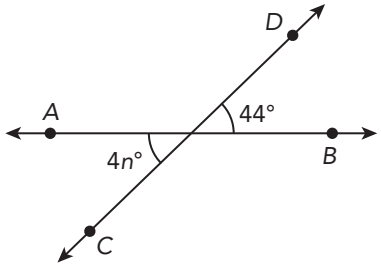
$y =$ _____ Simplify.

Use algebra and vertical angles to find the value of each variable.

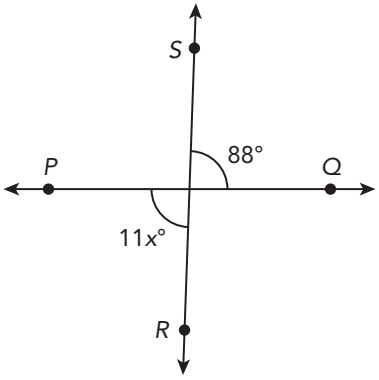
14. $\overleftrightarrow{PQ}$ and $\overleftrightarrow{RS}$ are straight lines.



15. $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are straight lines.



16. $\overleftrightarrow{PQ}$ and $\overleftrightarrow{RS}$ are straight lines.

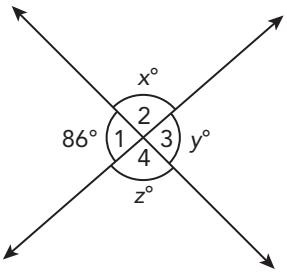


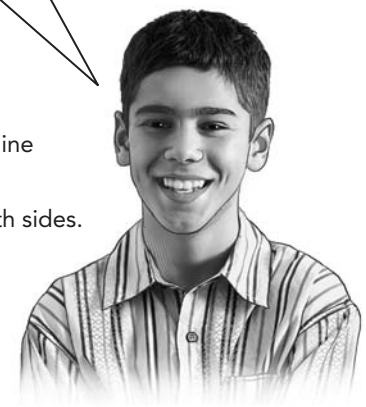
Name: _____ Date: _____

Apply reasoning to find the value of each variable.

Example

In the diagram, two straight lines intersect to form angles 1, 2, 3, and 4. Find the value of each variable if m∠1 = 86°.

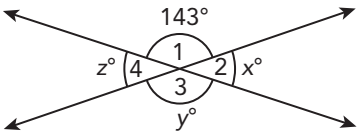




$m\angle 1 + m\angle 2 = 180°$	Adj. ∠s on a straight line
$86° + x° = 180°$	Substitute.
$86° + x° - 86° = 180° - 86°$	Subtract 86° from both sides.
$x = 94°$	Simplify.
$m\angle 3 = m\angle 1$	Vert. ∠s
$y = 86$	Substitute.
$m\angle 4 = m\angle 2$	Vert. ∠s
$z = 94$	Substitute.

Complete.

17. In the diagram, two straight lines intersect to form angles 1, 2, 3, and 4. Find the value of each variable if m∠1 = 143°.



$m\angle 1 + m\angle 4 = 180°$	Adj. ∠s on a st. line
_____ + _____ = 180°	Substitute.
_____ + _____ − _____ = 180° − _____	Subtract 143° from both sides.
Z = _____	Simplify.

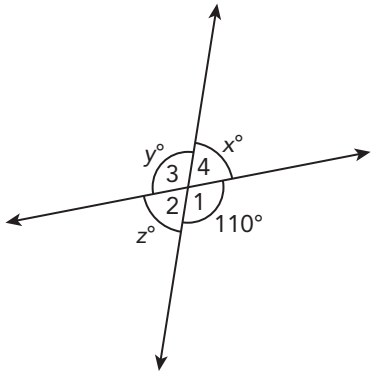
$m\angle 3 = m\angle 1$ $\qquad$ $m\angle 2 = m\angle 4$

y = _____ $\qquad$ x = _____

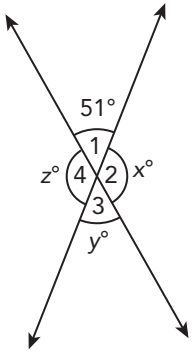
Name: _____ Date: _____

Apply reasoning to find the value of each variable.

18. In the diagram, two straight lines intersect to form angles 1, 2, 3, and 4. Find the value of each variable if m∠1 = 110°.



19. In the diagram, two straight lines intersect to form angles 1, 2, 3, and 4. Find the value of each variable if m∠1 = 51°.



20. In the diagram, two straight lines intersect to form angle measures $x°$, $y°$, $z°$, and 159°. Find the value of each variable.