

Angle Vocabulary

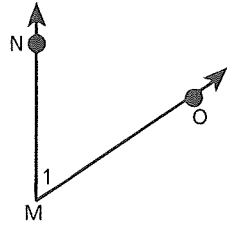
Geometry uses special vocabulary to describe and classify angles and their parts. Match each term in the word box to its definition.

vertical	adjacent	vertex	side	linear	acute
obtuse	right	straight	complementary	supplementary	bisector

- 1 _____ This is the common endpoint of two rays that form an angle.
- 2 _____ This describes a pair of adjacent angles whose noncommon sides are opposite rays.
- 3 _____ This describes any two non-overlapping angles that share a common ray and a common vertex.
- 4 _____ This describes an angle having a measure greater than 90° and less than 180° .
- 5 _____ This refers to one of the rays that form an angle.
- 6 _____ This describes an angle that has a measure of exactly 90° .
- 7 _____ These are also called opposite angles. They are nonadjacent angles formed by intersecting lines.
- 8 _____ This describes a pair of angles with combined measures that equal 90° .
- 9 _____ This describes a pair of angles with combined measures that equal 180° .
- 10 _____ This describes an angle that measures exactly 180° .
- 11 _____ This refers to a point, line, or plane that divides a geometric figure into congruent halves.
- 12 _____ This describes an angle having a measure greater than 0° and less than 90° .

Name and Label Angles

Angles are formed when two rays share a common endpoint.

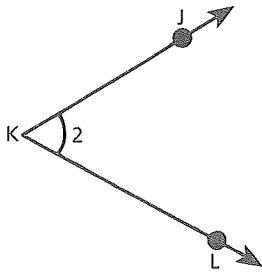


Point M is the vertex.
 \overrightarrow{MN} and \overrightarrow{MO} are the sides.

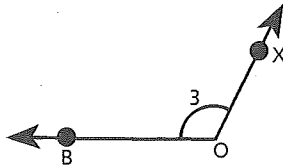
There are four ways to name this angle:
 $\angle 1$, $\angle M$, $\angle NMO$, or $\angle OMN$

When naming angles by their points, the vertex point must always be the center letter.

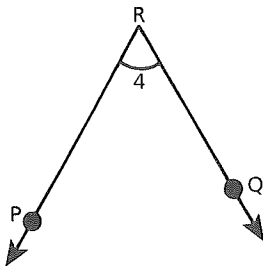
Use the diagram to complete the information.



- 1 Vertex: _____
- 2 Sides: _____ and _____
- 3 Four names for this angle: _____



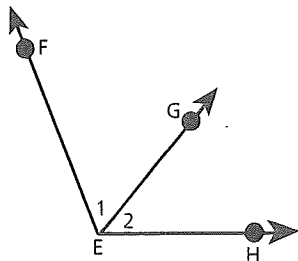
- 4 Vertex: _____
- 5 Sides: _____ and _____
- 6 Four names for this angle: _____



- 7 Vertex: _____
- 8 Sides: _____ and _____
- 9 Four names for this angle: _____

Name and Label Connected Angles

Angles can be connected to other angles.



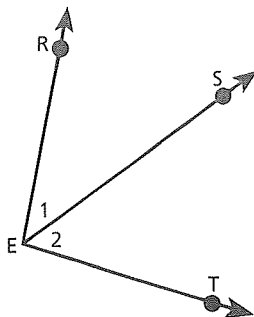
Point E is the vertex for both angles.
 \overline{EG} is the common side.

One angle is $\angle 1$.
 $\angle 1$ can be named $\angle FEG$ or $\angle GEF$.

The second angle is $\angle 2$.
 $\angle 2$ can be named $\angle GEH$ or $\angle HEG$.

The last angle can be named $\angle FEH$ or $\angle HEF$.
 None can be called $\angle E$ because there is more than one angle with that vertex.

Use the diagram to complete the information.



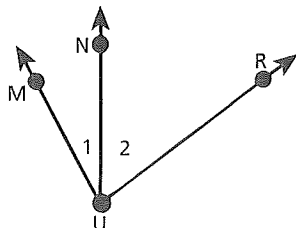
1 Common vertex: _____

2 Common side: _____

3 Names for first angle: _____

4 Names for second angle: _____

5 Names for third angle: _____



6 Common vertex: _____

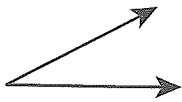
7 Common side: _____

8 Names for three different angles: _____

Classify Angles

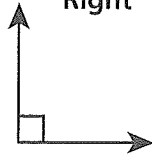
Angles are measured in units called **degrees**. An angle can be classified by its measure.

Acute



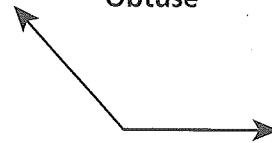
Acute angles have measures greater than 0° and less than 90° .

Right



Right angles have measures equal to 90° . Notice the symbol for right angle.

Obtuse



Obtuse angles have measures greater than 90° and less than 180° .

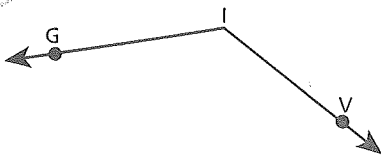
Straight



Straight angles have measures equal to 180° .

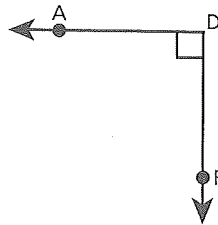
Use the types of angles above to label each illustration. Write three names for each angle.

1



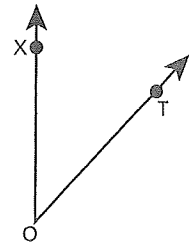
Angle: _____

2



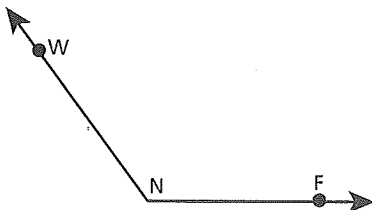
Angle: _____

3



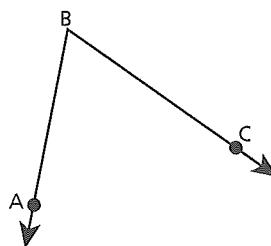
Angle: _____

4



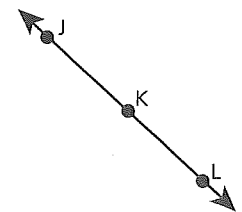
Angle: _____

5



Angle: _____

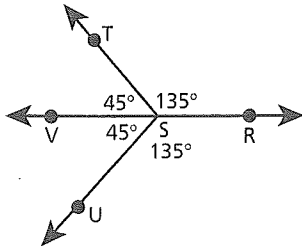
6



Angle: _____

Identify Congruent Angles

Angles with the same measure are congruent.



In this diagram, \overleftrightarrow{VR} bisects the right angle TSU to form two sets of congruent angles.

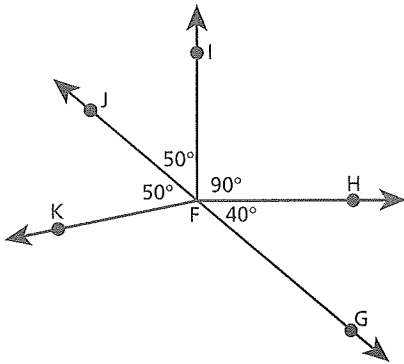
$\angle TSV$ and $\angle USV$ are acute angles with the same measure. They are congruent.

$$\angle TSV \cong \angle USV$$

$\angle TSR$ and $\angle USR$ are obtuse angles with the same measure.

$$\angle TSR \cong \angle USR$$

Use the diagram to find congruent angles.



1 Name three acute angles. _____

2 Name two obtuse angles. _____

3 Name one right angle. _____

4 Which angles are congruent? _____

5 Name a bisector. _____

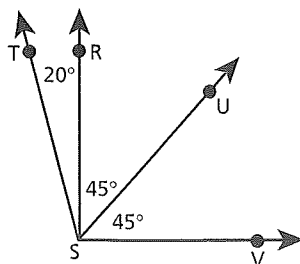
6 Name four acute angles. _____

7 Name one obtuse angle. _____

8 Name one right angle. _____

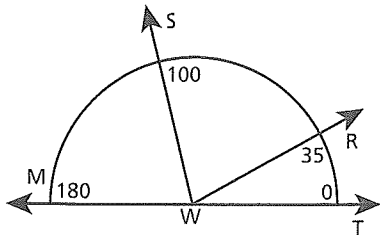
9 Which angles are congruent? _____

10 Name a bisector. _____



Add and Subtract to Find Angle Measures

Find the measure of angles by adding and subtracting known measures.



Find the measure of $\angle SWR$.

This diagram shows the measure of each angle from 0° . Measure can be abbreviated as m .

$$m\angle RWT = 35^\circ \quad m\angle SWT = 100^\circ$$

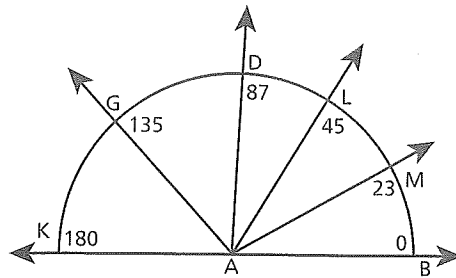
To find $m\angle SWR$, subtract the known measures.

$$m\angle SWT - m\angle RWT = m\angle SWR.$$

$$100^\circ - 35^\circ = 65^\circ$$

$$m\angle SWR = 65^\circ$$

Use the diagram. Show how you add or subtract known measures to find the measures of the given angles.



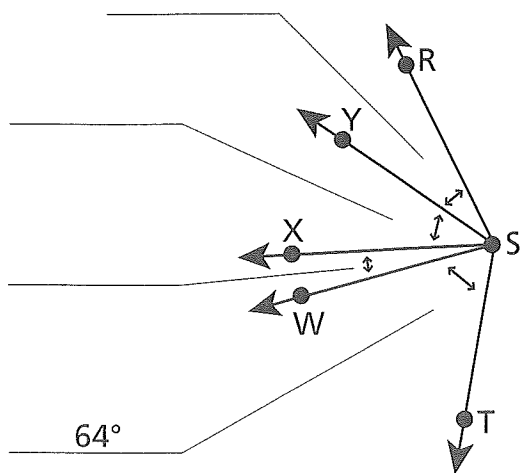
- | | |
|--------------------------|--|
| 1 $m\angle MAB =$ _____ | 2 $m\angle LAB =$ _____ |
| 3 $m\angle DAB =$ _____ | 4 $m\angle GAB =$ _____ |
| 5 $m\angle KAB =$ _____ | 6 $m\angle DAM =$ _____ |
| 7 $m\angle KAG =$ _____ | 8 $m\angle DAK =$ _____ |
| 9 $m\angle LAG =$ _____ | 10 $m\angle MAG =$ _____ |
| 11 $m\angle LAK =$ _____ | 12 Name two pairs of congruent angles. |

_____ \cong _____

_____ \cong _____

Calculate Angle Measures

Label the diagram using the given measures. Then find the measure of angles by adding and subtracting known measures.

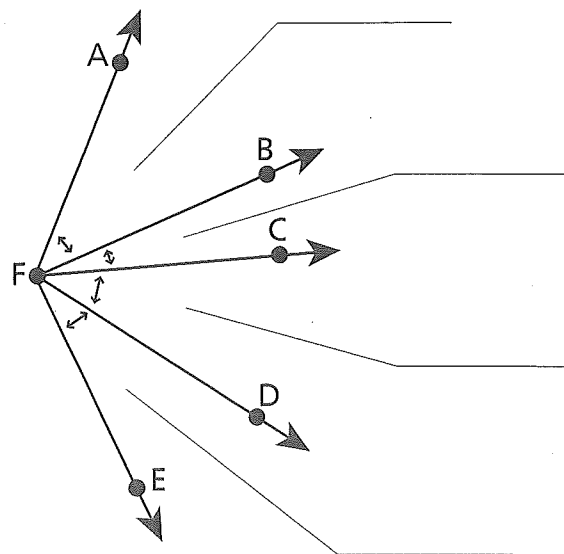


Label the angles. The first one is done for you.

- 1 $m\angle WST = 64^\circ$
- 2 $m\angle RSY = 30^\circ$
- 3 $m\angle WSX = 11^\circ$
- 4 $m\angle XSY = 33^\circ$

Find these measures:

- 5 $m\angle RSX =$ _____
- 6 $m\angle RST =$ _____
- 7 $m\angle TSX =$ _____
- 8 $m\angle WSY =$ _____
- 9 $m\angle TSY =$ _____
- 10 $m\angle WSR =$ _____



Label the angles.

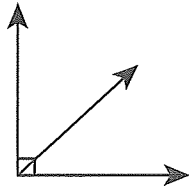
- 11 $m\angle AFB = 45^\circ$
- 12 $m\angle BFC = 22^\circ$
- 13 $m\angle DFE = 33^\circ$
- 14 $m\angle CFD = 41^\circ$

Find these measures:

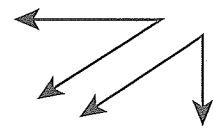
- 15 $m\angle AFC =$ _____
- 16 $m\angle DFB =$ _____
- 17 $m\angle AFD =$ _____
- 18 $m\angle BFE =$ _____
- 19 $m\angle EFA =$ _____
- 20 $m\angle EFC =$ _____

Complementary and Perpendicular Angles

Two angles are **complementary** if the sum of their measures is 90° . Each angle is the complement of the other.



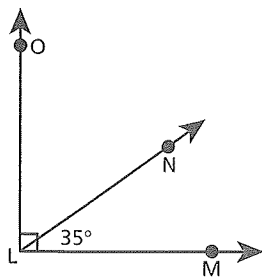
Adjacent complementary angles share a common side and vertex. The sum of the two angle measures is 90° .



Nonadjacent complementary angles do not share a common side or vertex. The sum of the two angle measures is 90° .

Use the given measure to determine the complementary angle's measure. Label each illustration as **adjacent** or **nonadjacent**.

1

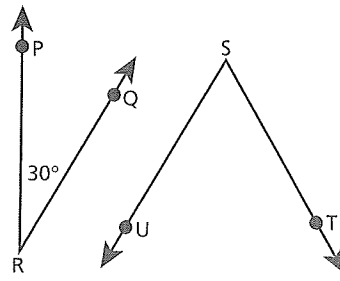


$m\angle OLN =$ _____

$m\angle NLM =$ _____

Type: _____

2

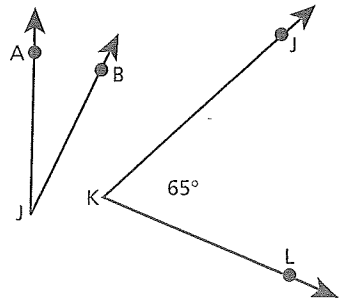


$m\angle PRQ =$ _____

$m\angle UST =$ _____

Type: _____

3

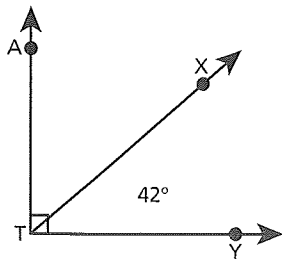


$m\angle JKL =$ _____

$m\angle AKB =$ _____

Type: _____

4

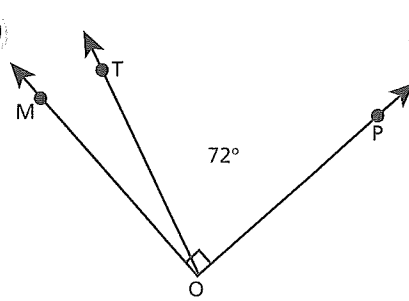


$m\angle XTY =$ _____

$m\angle ATX =$ _____

Type: _____

5

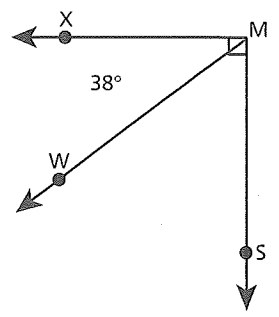


$m\angle TOP =$ _____

$m\angle MOT =$ _____

Type: _____

6



$m\angle XMW =$ _____

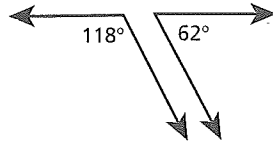
$m\angle SMW =$ _____

Type: _____

Supplementary and Linear Angles

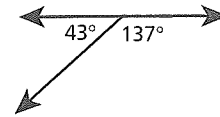
Two angles are supplementary if the sum of their measures is 180° . Each angle is the supplement of the other. If the supplementary angles are adjacent, then they are also known as a linear pair.

Supplementary Pair



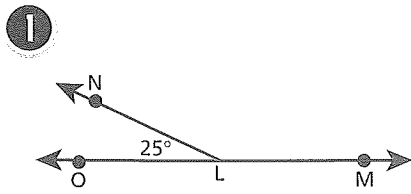
The sum of the angles is 180° . They are not adjacent so they are a supplementary pair.

Linear Pair



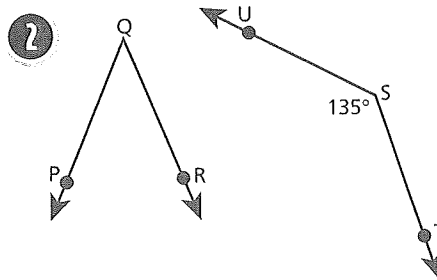
The sum of these adjacent angles is 180° . If the two sides they don't share form opposite rays, then they are also called a linear pair.

Use the given measure to determine the supplementary angle's measure. If the pair form a linear pair, label the illustration **linear**.



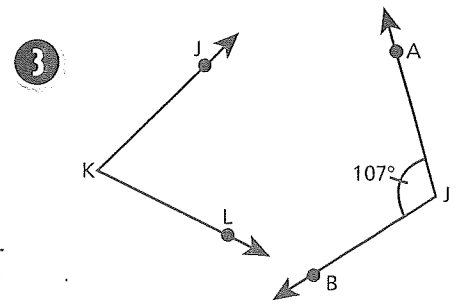
$m\angle OLN =$ _____

$m\angle NLM =$ _____



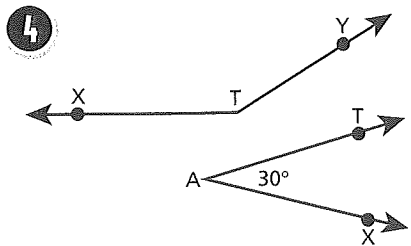
$m\angle PQR =$ _____

$m\angle UST =$ _____



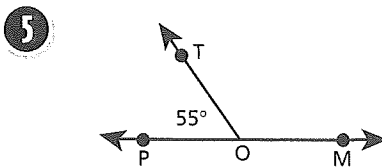
$m\angle JKL =$ _____

$m\angle AJB =$ _____



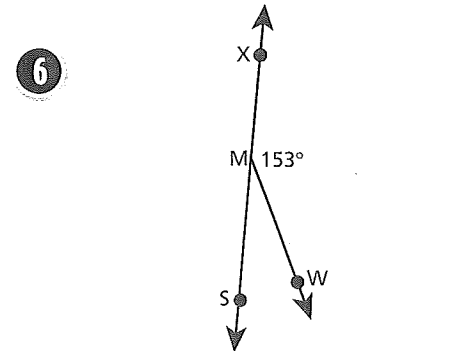
$m\angle XTY =$ _____

$m\angle TAX =$ _____



$m\angle TOP =$ _____

$m\angle MOT =$ _____



$m\angle XMW =$ _____

$m\angle SMW =$ _____

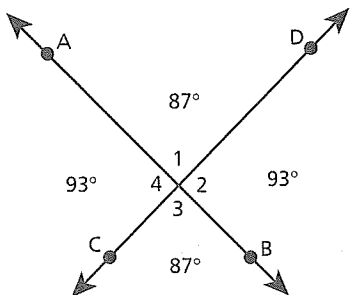
Find Values of Angles

Supplementary or linear pairs have sums of 180° . Complementary pairs have sums of 90° . Use the given information to find the missing angle measures.

- | | |
|--|---|
| <p>1 $\angle A$ and $\angle B$ are supplementary angles.
 $m\angle A = 32^\circ$
 $m\angle B =$ _____
 Why? _____</p> | <p>2 $\angle C$ and $\angle D$ are supplementary angles.
 $m\angle C = 102^\circ$
 $m\angle D =$ _____
 Why? _____</p> |
| <p>3 $\angle X$ and $\angle Y$ are linear angles.
 $m\angle X = 98^\circ$
 $m\angle Y =$ _____
 Why? _____</p> | <p>4 $\angle G$ and $\angle H$ are complementary angles.
 $m\angle G = 41^\circ$
 $m\angle H =$ _____
 Why? _____</p> |
| <p>5 $\angle M$ and $\angle P$ are supplementary angles.
 $m\angle M = 43^\circ$
 $m\angle P =$ _____
 Why? _____</p> | <p>6 $\angle J$ and $\angle Y$ are linear angles.
 $m\angle Y = 93^\circ$
 $m\angle J =$ _____
 Why? _____</p> |
| <p>7 $\angle T$ and $\angle V$ are linear angles.
 $m\angle T = 57^\circ$
 $m\angle V =$ _____
 Why? _____</p> | <p>8 $\angle F$ and $\angle O$ are supplementary angles.
 $m\angle F = 111^\circ$
 $m\angle O =$ _____
 Why? _____</p> |
| <p>9 $\angle E$ and $\angle R$ are complementary angles.
 $m\angle E = 16^\circ$
 $m\angle R =$ _____
 Why? _____</p> | <p>10 $\angle S$ and $\angle U$ are supplementary angles.
 $m\angle S = 18^\circ$
 $m\angle U =$ _____
 Why? _____</p> |

Vertical Angles

Vertical angles can be thought of as opposite angles. Their sides form two pairs of opposite rays. Vertical angles are the nonadjacent angles formed when two lines intersect.



Line AB and line CD intersect.

Angle 1 and angle 3 are vertical angles.

Angle 2 and angle 4 are vertical angles.

Vertical angles are congruent. The angle measure for each vertical angle pair will be the same.

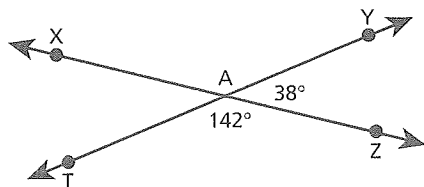
Adjacent angles are supplementary.

$$\angle 1 + \angle 2 = 180^\circ$$

$$\angle 3 + \angle 4 = 180^\circ$$

Use vertical angles to determine the missing measures. Name the vertical angle pairs.

1



$m\angle XAY =$ _____

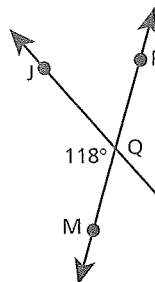
$m\angle XAT =$ _____

Vertical pairs:

_____ and _____

_____ and _____

2



$m\angle PQN =$ _____

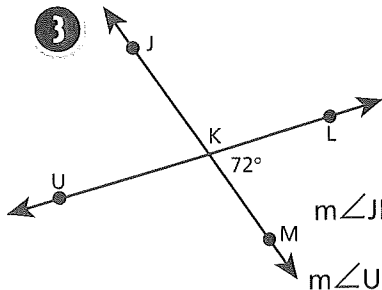
$m\angle JQP =$ _____

Vertical pairs:

_____ and _____

_____ and _____

3



$m\angle JKL =$ _____

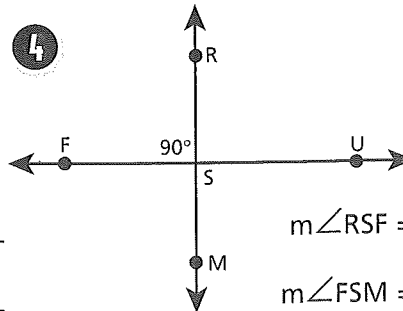
$m\angle UKJ =$ _____

Vertical pairs:

_____ and _____

_____ and _____

4



$m\angle RSF =$ _____

$m\angle FSM =$ _____

Vertical pairs:

_____ and _____

_____ and _____

Find Missing Angle Measurements

Use your understanding of complementary, supplementary, and linear angles to find the missing measures.

$\angle 10$ and $\angle 11$ are complementary angles.

1 If $m\angle 10 = 32^\circ$, then $m\angle 11 =$ _____

2 If $m\angle 10 = 63^\circ$, then $m\angle 11 =$ _____

3 If $m\angle 10 = 11^\circ$, then $m\angle 11 =$ _____

$\angle 14$ and $\angle 15$ are supplementary angles.

4 If $m\angle 14 = 68^\circ$, then $m\angle 15 =$ _____

5 If $m\angle 14 = 111^\circ$, then $m\angle 15 =$ _____

6 If $m\angle 14 = 87^\circ$, then $m\angle 15 =$ _____

$\angle M$ and $\angle P$ are linear angles.

7 If $m\angle M = 67^\circ$, then $m\angle P =$ _____

8 If $m\angle M = 132^\circ$, then $m\angle P =$ _____

9 If $m\angle M = 44^\circ$, then $m\angle P =$ _____

$\angle 5$ and $\angle 6$ are complementary angles. $\angle 6$ and $\angle 7$ are supplementary angles.
All are nonadjacent.

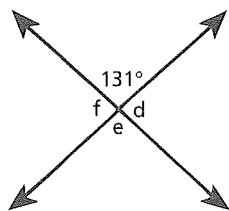
10 If $m\angle 5 = 34^\circ$, then $m\angle 6 =$ _____, and $m\angle 7 =$ _____

11 If $m\angle 6 = 50^\circ$, then $m\angle 5 =$ _____, and $m\angle 7 =$ _____

12 If $m\angle 7 = 132^\circ$, then $m\angle 6 =$ _____, and $m\angle 5 =$ _____

Determine Missing Angles

Use what you know about complementary, supplementary, and vertical angles to determine the missing angle measures.

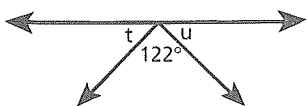


Vertical angles are congruent.
Therefore, $e = 131^\circ$.

The sum of linear supplemental angles is equal to 180° .
Therefore, $e + f = 180^\circ$.
 $131^\circ + f = 180^\circ$.
 $f = 49^\circ$

Angles f and d are vertical.
Therefore, $d = 49^\circ$.

1

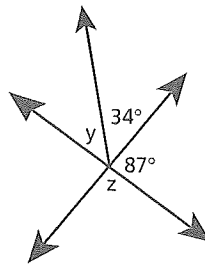


$$\angle t \cong \angle u$$

$$m\angle t = \underline{\hspace{2cm}}$$

$$m\angle u = \underline{\hspace{2cm}}$$

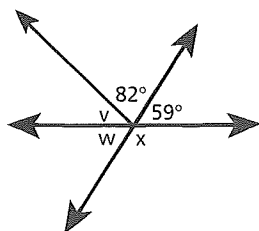
2



$$m\angle y = \underline{\hspace{2cm}}$$

$$m\angle z = \underline{\hspace{2cm}}$$

3

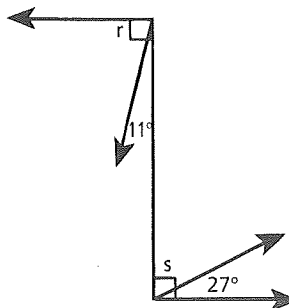


$$m\angle v = \underline{\hspace{2cm}}$$

$$m\angle x = \underline{\hspace{2cm}}$$

$$m\angle w = \underline{\hspace{2cm}}$$

4

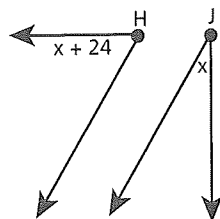


$$m\angle r = \underline{\hspace{2cm}}$$

$$m\angle s = \underline{\hspace{2cm}}$$

Angles and Algebra

Use algebraic equations to find a missing angle measure.



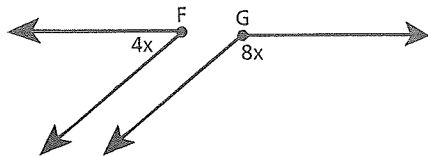
$\angle J$ and $\angle H$ are complementary.

$m\angle J = x$
 $m\angle H = x + 24$

$x + x + 24 = 90^\circ$
 $2x + 24 = 90^\circ$
 $2x = 66^\circ$
 $x = 33^\circ$
 $m\angle J = 33^\circ, m\angle H = 57^\circ$

Write and solve an equation to find the value of x .

1



$\angle F$ and $\angle G$ are supplementary.

$m\angle F = \underline{\hspace{2cm}}$

$m\angle G = \underline{\hspace{2cm}}$

$\underline{\hspace{2cm}} = 180^\circ$

$m\angle F = \underline{\hspace{2cm}}, m\angle G = \underline{\hspace{2cm}}$

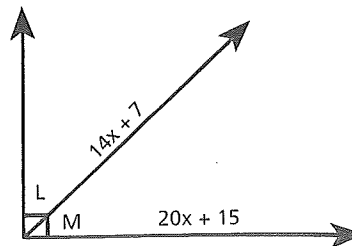
2 $\angle L$ and $\angle M$ are complementary.

$m\angle L = \underline{\hspace{2cm}}$

$m\angle M = \underline{\hspace{2cm}}$

$\underline{\hspace{2cm}} = 90^\circ$

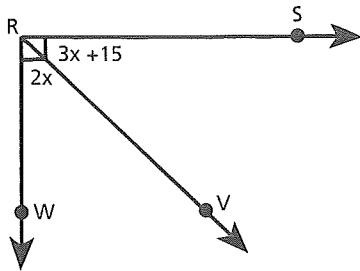
$m\angle L = \underline{\hspace{2cm}}, m\angle M = \underline{\hspace{2cm}}$



More Applications of Algebra

Use properties of angles to write and solve algebraic equations.

1



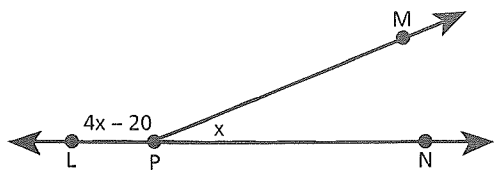
$\angle SRV$ and $\angle WRV$ are complementary.

$m\angle SRV =$ _____

$m\angle WRV =$ _____

$m\angle SRV =$ _____, $m\angle WRV =$ _____

2



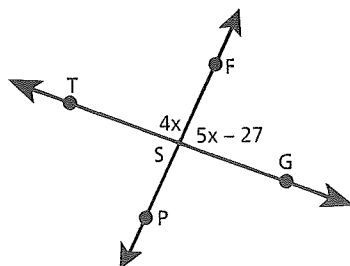
$\angle MPN$ and $\angle LPM$ are linear.

$m\angle MPN =$ _____

$m\angle LPM =$ _____

$m\angle MPN =$ _____, $m\angle LPM =$ _____

3



\overleftrightarrow{TG} and \overleftrightarrow{FP} intersect at Point S.

$m\angle FSG =$ _____

$m\angle FST =$ _____

$m\angle FSG =$ _____, $m\angle FST =$ _____

$m\angle PSG =$ _____, $m\angle PST =$ _____

Find Geometric Answers (page 14)

- \overrightarrow{QP} , \overrightarrow{PR} or \overrightarrow{RP} , \overrightarrow{RQ} or \overrightarrow{QR}
- \overrightarrow{PO} or \overrightarrow{OP} , \overrightarrow{TR} or \overrightarrow{RT} , \overrightarrow{PQ} or \overrightarrow{QP} , \overrightarrow{PR} or \overrightarrow{RP} , \overrightarrow{QR} or \overrightarrow{RQ} , \overrightarrow{XY} or \overrightarrow{YX}
- \overrightarrow{RT} or \overrightarrow{TR} , \overrightarrow{XY} or \overrightarrow{YX}
- \overrightarrow{QP} , \overrightarrow{PR} , \overrightarrow{RQ} , \overrightarrow{RT} , \overrightarrow{XY}
- \overrightarrow{OP} , \overrightarrow{RT} , \overrightarrow{XY}
- Possible answers: \overrightarrow{PR} and \overrightarrow{PO} , \overrightarrow{PR} and \overrightarrow{RT}
- a ray because it only has one endpoint
- yes, because they both name points on the same line
- yes, because they are on the same plane but do not intersect
- yes, if both continued on they would eventually cross each other

Congruence of Segments (page 15)

1. true 2. true
3. false 4. false
5. true 6. true
7. true 8. true
9. $\overline{JK} = 4$; $\overline{LM} = 2$; $\overline{MN} = 3$; $\overline{PQ} = 4$
10. $\overline{NO} = 2$; $\overline{MN} = 3$; $\overline{QR} = 2$; $\overline{KL} = 2$
11. $\overline{KL} = 2$; $\overline{OP} = 1$; $\overline{QR} = 2$; $\overline{PQ} = 4$
12. $\overline{MN} = 3$; $\overline{ON} = 2$; $\overline{QP} = 4$; $\overline{KJ} = 4$

Add to Find Congruent Segments (page 16)

1. false 2. false
3. false 4. false
5. true 6. true
7. true 8. false
9. $\overline{JK} = 4$; $\overline{JM} = 8$; $\overline{MK} = 4$; $\overline{RP} = 6$
10. $\overline{LO} = 7$; $\overline{MN} = 3$; $\overline{PR} = 6$; $\overline{KN} = 7$
11. $\overline{MJ} = 8$; $\overline{OL} = 7$; $\overline{QN} = 7$; $\overline{PR} = 6$
12. $\overline{MP} = 6$; $\overline{JM} = 8$; $\overline{KN} = 7$; $\overline{LP} = 8$

Subtract to Find Segment Lengths (page 17)

1. 9, 6, 15 2. 20, 39, 8.5
3. 30, 78, 48 4. 44, 16, 26
5. 18 6. 21
7. 4 8. 8
9. 21 10. 18

11. 39 12. 12
13. 33

Find Congruent Line Segments (page 18)

1. 18 2. 40
3. 44 4. 52
5. 4 6. 12
7. 34 8. 52
9. 26 10. 34
11. 74 12. 8
13. 30 14. 48
15. 22 16. 40
17. true 18. false
19. false 20. true
21. false 22. true
23. false 24. false
25. false 26. true

Geometry and Algebraic Equations (page 19)

1. $x = 19$ 2. $x = 9$
3. $x = 8$ 4. $x = 5$

Angle Vocabulary (page 20)

1. vertex 2. linear
3. adjacent 4. obtuse
5. side 6. right
7. vertical 8. complementary
9. supplementary 10. straight
11. bisector 12. acute

Name and Label Angles (page 21)

1. Point K 2. \overrightarrow{KJ} and \overrightarrow{KL}
3. $\angle 2$, $\angle K$, $\angle JKL$, $\angle LKJ$
4. Point O 5. \overrightarrow{OB} and \overrightarrow{OX}
6. $\angle 3$, $\angle O$, $\angle XO B$, $\angle BOX$
7. Point R 8. \overrightarrow{RP} and \overrightarrow{RQ}
9. $\angle 4$, $\angle R$, $\angle PRQ$, $\angle QRP$

Name and Label Connected Angles (page 22)

- Point E
- \vec{ES}
- $\angle 1$, $\angle RES$, $\angle SER$
- $\angle 2$, $\angle SET$, $\angle TES$
- $\angle RET$, $\angle TER$
- Point U
- \vec{UN}
- $\angle 1$, $\angle MUN$, $\angle NUM$, $\angle 2$, $\angle NUR$, $\angle RUN$, $\angle MUR$, $\angle RUM$

Classify Angles (page 23)

- obtuse; $\angle I$, $\angle GIV$, $\angle VIG$
- right; $\angle D$, $\angle ADF$, $\angle FDA$
- acute; $\angle O$, $\angle XOT$, $\angle TOX$
- obtuse; $\angle N$, $\angle WNF$, $\angle FNW$
- acute; $\angle B$, $\angle ABC$, $\angle CBA$
- straight; $\angle K$, $\angle JKL$, $\angle LKJ$

Identify Congruent Angles (page 24)

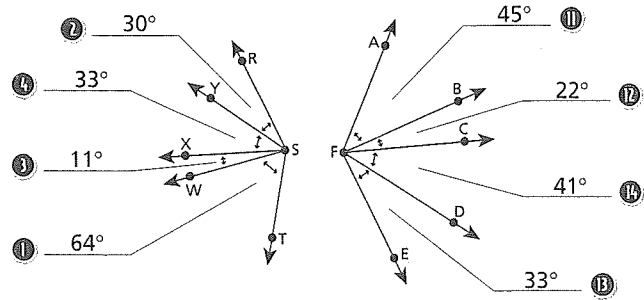
Note: For all angles and lines, letters can be written in reverse order.

- $\angle IFJ$, $\angle JFK$, $\angle GFH$
- $\angle GFK$, $\angle IFK$, $\angle IFG$, $\angle JFH$
- $\angle HFI$
- $\angle IFJ \cong \angle JFK$
- \vec{JG}
- $\angle TSR$, $\angle RSU$, $\angle TSU$, or $\angle USV$
- $\angle TSV$
- $\angle RSV$
- $\angle RSU \cong \angle USV$
- \vec{SU} (can only be written in this order)

Add and Subtract to Find Angle Measures (page 25)

- 23°
- 45°
- 87°
- 135°
- 180°
- $m \angle DAB - m \angle MAB = 87 - 23 = 64^\circ$
- $m \angle KAB - m \angle GAB = 180 - 135 = 45^\circ$
- $m \angle KAB - m \angle DAB = 180 - 87 = 93^\circ$
- $m \angle GAB - m \angle LAB = 135 - 45 = 90^\circ$
- $m \angle GAB - m \angle MAB = 135 - 23 = 112^\circ$
- $m \angle KAB - m \angle LAB = 180 - 45 = 135^\circ$
- $\angle GAB \cong \angle LAK$, $\angle LAB \cong \angle KAG$

Calculate Angle Measures (page 26)



- 63°
- 138°
- 75°
- 44°
- 108°
- 74°
- 67°
- 63°
- 108°
- 96°
- 141°
- 74°

Complementary and Perpendicular Angles (page 27)

- 55° , 35° , adjacent
- 30° , 60° , nonadjacent
- 65° , 25° , nonadjacent
- 42° , 48° , adjacent
- 72° , 18° , adjacent
- 38° , 52° , adjacent

Supplementary and Linear Angles (page 28)

- 25° , 155° , linear
- 45° , 135°
- 73° , 107°
- 150° , 30°
- 55° , 125° , linear
- 153° , 27° , linear

Find Values of Angles (page 29)

- 148° ; Both total 180°
- 78° ; Both total 180°
- 82° ; Both adjacent angles total 180°
- 49° ; Both total 90°
- 137° ; Both total 180°
- 87° ; Both adjacent angles total 180°
- 123° ; Both adjacent angles total 180°
- 69° ; Both total 180°

9. 74° ; Both total 90°
 10. 162° ; Both total 180°

Vertical Angles (page 30)

1. $142^\circ, 38^\circ$
 $\angle XAY$ and $\angle TAZ$
 $\angle XAT$ and $\angle YAZ$
2. $118^\circ, 62^\circ$
 $\angle PQN$ and $\angle JQM$
 $\angle JQP$ and $\angle MQN$
3. $108^\circ, 72^\circ$
 $\angle JKL$ and $\angle UKM$
 $\angle JKU$ and $\angle LKM$
4. $90^\circ, 90^\circ$
 $\angle RSU$ and $\angle FSM$
 $\angle RSF$ and $\angle USM$

Identify Types of Angles (page 31)

1. $\angle 6$ and $\angle 4$; $\angle 3$ and $\angle 5$
 2. $\angle 1$ and $\angle 2$
 3. $\angle 6$ and $\angle 4$
 4. $\angle 3$ and $\angle 4$; $\angle 5$ and $\angle 6$; $\angle 1$ and $\angle 2$
 5. $\angle DGJ$ and $\angle FGH$; $\angle DGF$ and $\angle H GJ$
 6. $\angle CFB$ and $\angle BFJ$; $\angle FGD$ and $\angle DGJ$; $\angle FGH$ and $\angle H GJ$
 7. $\angle DGF$ and $\angle H GJ$
 8. $\angle FGD$ and $\angle DGJ$; $\angle FGH$ and $\angle H GJ$; $\angle FGD$ and $\angle FGH$;
 $\angle DGJ$ and $\angle H GJ$

Find Missing Angle Measurements (page 32)

1. 58° 2. 27°
 3. 79° 4. 112°
 5. 69° 6. 93°
 7. 113° 8. 48°
 9. 136° 10. $56^\circ, 124^\circ$
 11. $40^\circ, 140^\circ$ 12. $48^\circ, 42^\circ$

Determine Missing Angles (page 33)

1. $29^\circ, 29^\circ$ 2. $59^\circ, 93^\circ$
 3. $39^\circ, 121^\circ, 59^\circ$ 4. $79^\circ, 63^\circ$

Angles and Algebra (page 34)

1. $4x$
 $8x$
 $8x + 4x = 180^\circ$
 $x = 15$
 $60^\circ, 120^\circ$
2. $(14x + 7)$
 $(20x + 15)$
 $(14x + 7) + (20x + 15) = 90^\circ$
 $x = 2$
 $35^\circ, 55^\circ$

More Applications of Algebra (page 35)

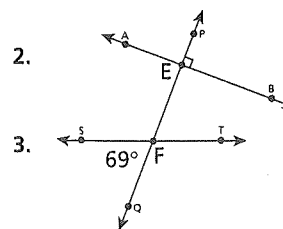
1. $3x + 15$
 $2x$
 $3x + 15 + 2x = 90^\circ$
 $x = 15$
 $60^\circ, 30^\circ$
2. x
 $4x - 20$
 $x + 4x - 20 = 180^\circ$
 $x = 40$
 $40^\circ, 140^\circ$
3. $5x - 27$
 $4x$
 $5x - 27 + 4x = 180$
 $x = 23$
 $88^\circ, 92^\circ$
 $92^\circ, 88^\circ$

Vocabulary to Describe Intersections (page 36)

- | | |
|------------------|------------------|
| 1. intersect | 2. perpendicular |
| 3. corresponding | 4. transversal |
| 5. exterior | 6. parallel |
| 7. alternate | 8. bisector |
| 9. same side | 10. interior |

Perpendicular Lines (page 37)

1. \overleftrightarrow{AB} , \overleftrightarrow{PQ} , \overleftrightarrow{ST}



- 2.
- 3.
4. right
5. They are perpendicular.
6. $69^\circ, 111^\circ,$
 111°
7. They intersect.