

Definitions (INCLUDE A PICTURE!!!):

Angle:

Acute angle:

Obtuse angle:

Complementary angles:

Supplementary angles:

Vertical angles:

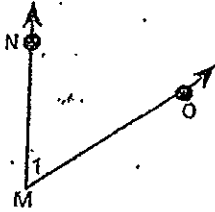
Right angles:

Straight angles:

Adjacent angles:

Name and Label Angles

Angles are formed when two rays share a common endpoint.

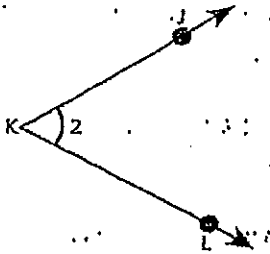


Point M is the vertex.
 \overrightarrow{MN} and \overrightarrow{MO} are the sides.

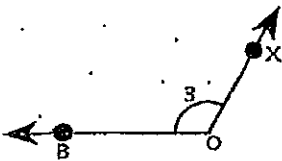
There are four ways to name this angle:
 $\angle 1$, $\angle M$, $\angle NMO$, or $\angle OMN$

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

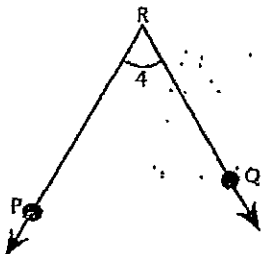
Use the diagram to complete the information.



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



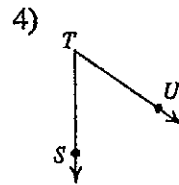
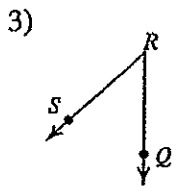
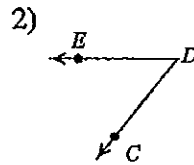
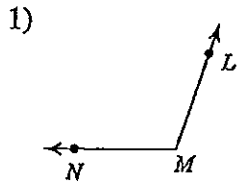
- 4 Vertex: _____
- 5 Sides: _____ and _____
- 6 Four names for this angle: _____



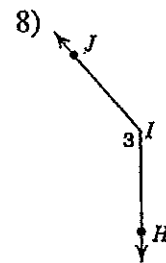
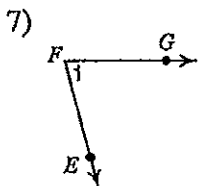
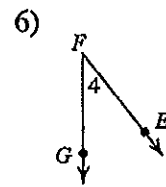
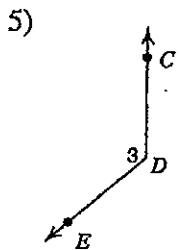
- 7 Vertex: _____
- 8 Sides: _____ and _____
- 9 Four names for this angle: _____

Naming Angles

Name the vertex and sides of each angle.



Name each angle in four ways.



Draw and label an angle to fit each description.

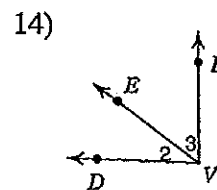
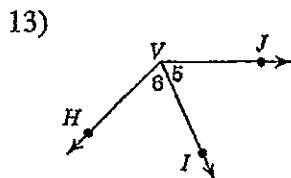
9) an obtuse angle, $\angle Y$

10) an acute angle, $\angle JIH$

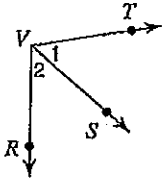
11) a right angle, $\angle 3$

12) a straight angle, $\angle CDE$

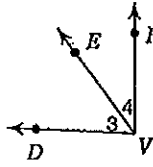
Name all the angles that have V as a vertex.



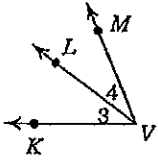
15)



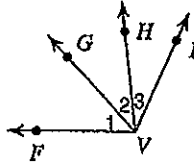
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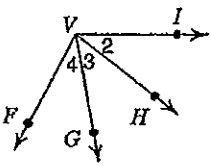
17)



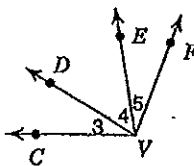
18)



19)

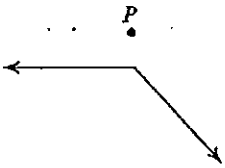


20)



State if the given point is interior, exterior, or on the angle.

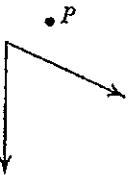
21)



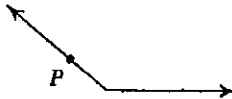
22)



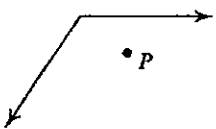
23)



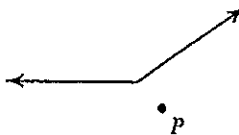
24)



25)



26)



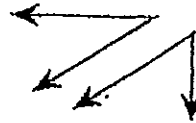
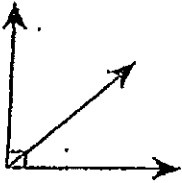
Critical thinking questions:

27) Draw a diagram with an acute angle ABC and an obtuse angle DBE so that point D is in the interior of angle ABC.

28) In question #29, why is it impossible for both point D and point E to be in the interior of angle ABC?

Complementary and Perpendicular Angles

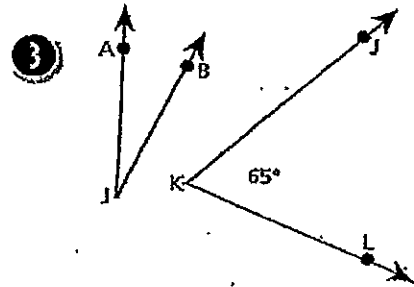
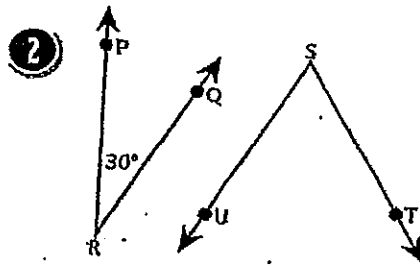
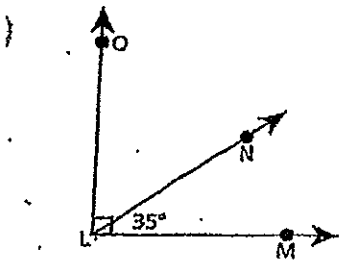
Two angles are complementary if the sum of their measures is 90° . Each angle is the complement of the other.



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.



$m\angle OLN =$ _____

$m\angle PRQ =$ _____

$m\angle JKL =$ _____

$m\angle NLM =$ _____

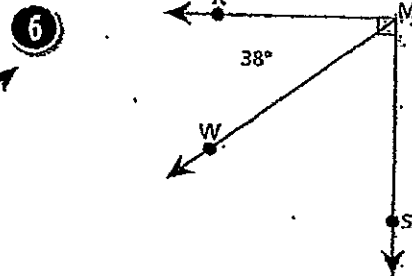
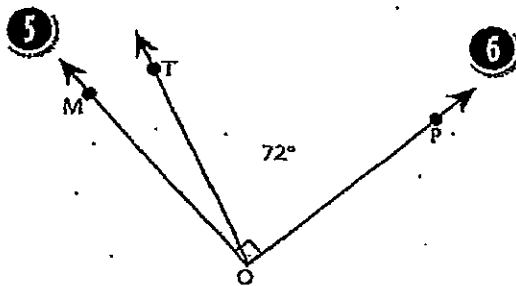
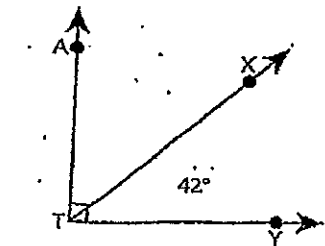
$m\angle UST =$ _____

$m\angle AJB =$ _____

Type: _____

Type: _____

Type: _____



$m\angle XTY =$ _____

$m\angle TOP =$ _____

$m\angle XMW =$ _____

$m\angle X =$ _____

$m\angle MOT =$ _____

$m\angle SMW =$ _____

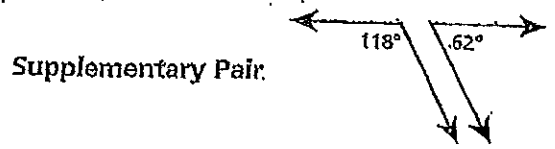
Type: _____

Type: _____

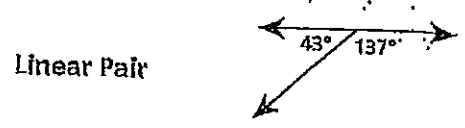
Type: _____

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.

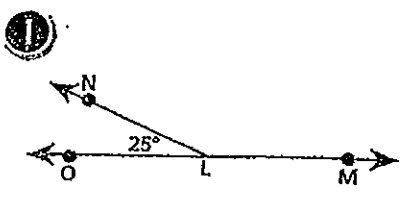


The sum of the angles is 180° . They are not adjacent so they are a supplementary pair.



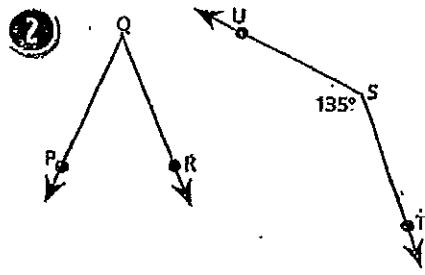
The sum of these adjacent angles is 180° . If the two sides they don't share form opposite rays, then they are also called a linear pair.

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



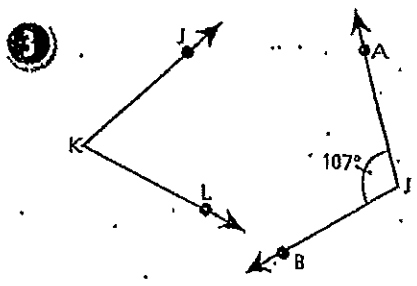
$m\angle OLN =$ _____

$m\angle NLM =$ _____



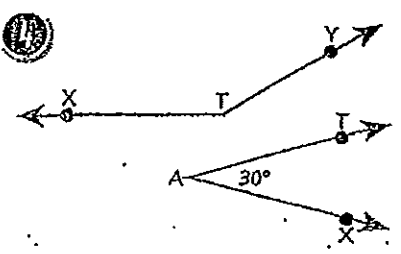
$m\angle PQR =$ _____

$m\angle UST =$ _____



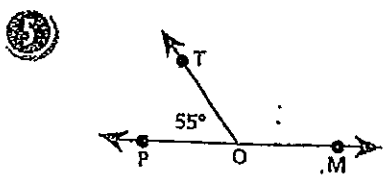
$m\angle JKL =$ _____

$m\angle AIB =$ _____



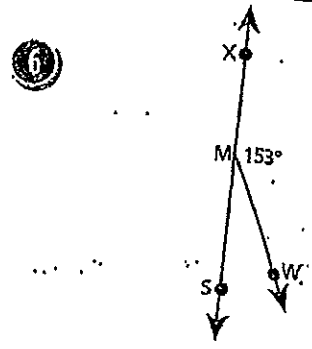
$m\angle XTY =$ _____

$m\angle TAX =$ _____



$m\angle TOP =$ _____

$m\angle MOT =$ _____



$m\angle XMW =$ _____

$m\angle SMW =$ _____

Name _____ Date _____

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.

- ① $\angle A$ and $\angle B$ are supplementary angles.
 $m\angle A = 32^\circ$
 $m\angle B =$ _____
Why? _____
- ② $\angle C$ and $\angle D$ are supplementary angles.
 $m\angle C = 102^\circ$
 $m\angle D =$ _____
Why? _____

- ③ $\angle X$ and $\angle Y$ are linear angles.
 $m\angle X = 98^\circ$
 $m\angle Y =$ _____
Why? _____
- ④ $\angle G$ and $\angle H$ are complementary angles.
 $m\angle G = 41^\circ$
 $m\angle H =$ _____
Why? _____

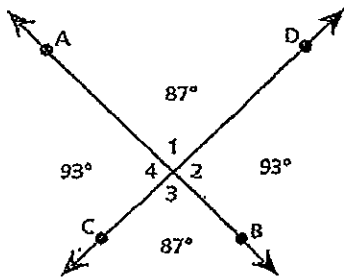
- ⑤ $\angle M$ and $\angle P$ are supplementary angles.
 $m\angle M = 43^\circ$
 $m\angle P =$ _____
Why? _____
- ⑥ $\angle J$ and $\angle Y$ are linear angles.
 $m\angle Y = 93^\circ$
 $m\angle J =$ _____
Why? _____

- ⑦ $\angle T$ and $\angle V$ are linear angles.
 $m\angle T = 57^\circ$
 $m\angle V =$ _____
Why? _____
- ⑧ $\angle F$ and $\angle O$ are supplementary angles.
 $m\angle F = 111^\circ$
 $m\angle O =$ _____
Why? _____

- ⑨ $\angle E$ and $\angle R$ are complementary angles.
 $m\angle E = 16^\circ$
 $m\angle R =$ _____
Why? _____
- ⑩ $\angle S$ and $\angle U$ are supplementary angles.
 $m\angle S = 18^\circ$
 $m\angle U =$ _____
Why? _____

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.

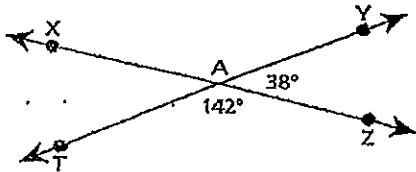
Adjacent angles are supplementary.

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

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

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

1



$m\angle XAY =$ _____

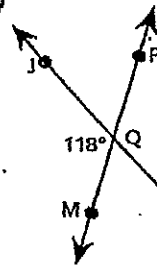
$m\angle XAT =$ _____

Vertical pairs:

_____ and _____

_____ and _____

2



$m\angle PQN =$ _____

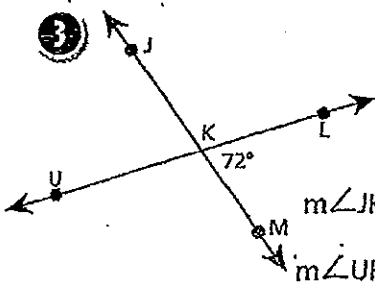
$m\angle JQP =$ _____

Vertical pairs:

_____ and _____

_____ and _____

3



$m\angle JKL =$ _____

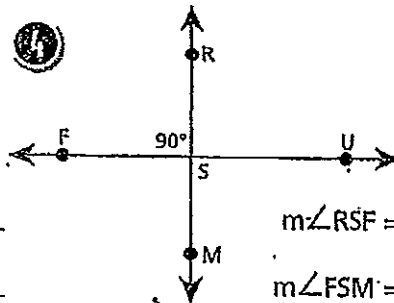
$m\angle UKJ =$ _____

Vertical pairs:

_____ and _____

_____ and _____

4



$m\angle RSF =$ _____

$m\angle FSM =$ _____

Vertical pairs:

_____ and _____

_____ and _____

Name _____

Date _____

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 $m\angle 7 =$ _____

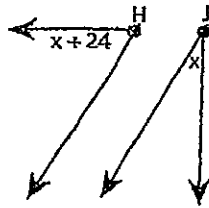
⑪ If $m\angle 6 = 50^\circ$, then $m\angle 5 =$ _____, and $m\angle 7 =$ _____

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

Name _____ Date _____

Angles and Algebra

Use algebraic equations to find a missing angle measure.



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

$$m\angle J = x$$

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

$$x + x + 24 = 90^\circ$$

$$2x + 24 = 90^\circ$$

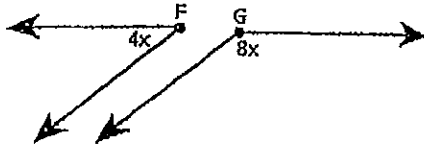
$$2x = 66^\circ$$

$$x = 33^\circ$$

$$m\angle J = 33^\circ, m\angle H = 57^\circ$$

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

1



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

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

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

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

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

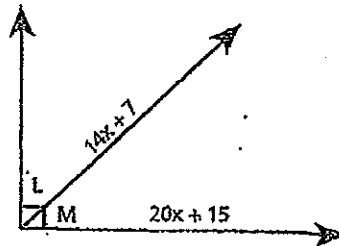
2 $\angle L$ and $\angle M$ are complementary.

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

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

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

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



21 Special Angles

Review It!

When you work with special angles, remember these words:

adjacent angles angles that have a common side and do not overlap

vertical angles opposite angles formed by intersecting lines (they are congruent)

supplementary angles two angles whose measures add up to 180°

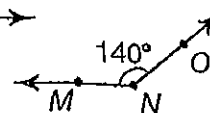
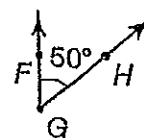
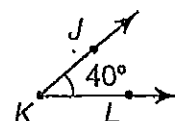
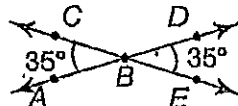
complementary angles two angles whose measures add up to 90°

$\angle ABC$ and $\angle CBD$ are adjacent angles.

$\angle ABC$ and $\angle DBE$ are vertical angles.

$\angle JKL$ and $\angle MNO$ are supplementary angles.

$\angle FGH$ and $\angle JKL$ are complementary angles.



If $\angle Y$ is complementary to $\angle B$ and $m\angle Y = 60^\circ$, what is the measure of $\angle B$?

Step 1 Write an equation.

$$m\angle B + m\angle Y = \underline{\hspace{2cm}}$$

REMEMBER If the measures of complementary angles add up to 90° .

Step 2 Substitute the measure in the question for $m\angle Y$.

$$m\angle B + \underline{\hspace{2cm}} = 90^\circ$$

Step 3 Solve the equation.

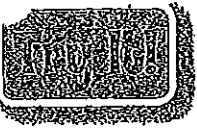
$$m\angle B + 60^\circ - \underline{\hspace{2cm}} = 90^\circ - \underline{\hspace{2cm}}$$

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

REMEMBER Subtract the same amount from both sides.

So, the measure of $\angle B$ is .

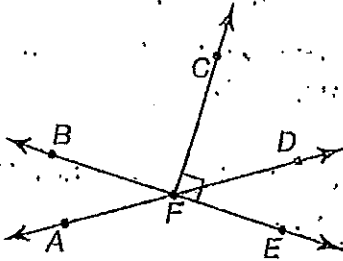
12



In the figure below, lines BE and AD intersect at point F . Ray FC is perpendicular to line BE . Use the figure to answer Questions 1-4:



1. Which two angles are complementary? _____

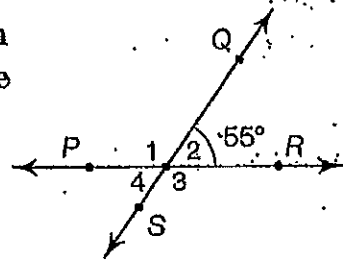


2. Which angle is supplementary to $\angle BFD$? _____

3. Name a pair of vertical angles _____

4. Which two angles are adjacent to $\angle BFD$? _____

Lines PR and QS intersect to form angles 1, 2, 3, and 4. Use this figure to find the angle measures.



5. $m\angle 4 =$ _____ 6. $m\angle 1 =$ _____ 7. $m\angle 3 =$ _____

Solve.

8. If $\angle U$ is supplementary to $\angle G$ and $m\angle U = 115^\circ$, what is the measure of $\angle G$?

9. If $\angle B$ is complementary to $\angle L$ and $m\angle B = 42^\circ$, what is the measure of $\angle L$?



1. Complementary angles together have a measure of 90 degrees.

3. Two adjacent angles are angles 2 and 4. They are vertical adjacent.

8. Complementary angles together have a measure of 90 degrees.

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