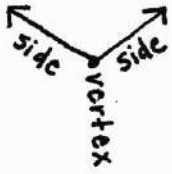
Angle Pair Relationships

VOCABULARY

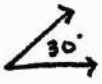
Ray: Part of a line that consists of a point called an endpoint and all points on the line that extend in one direction



Angle: Consists of two different rays with the same endpoint. The rays are called sides and the endpoint is called a vertex.

Sides of an angle
In an angle, the rays are called the sides of the angle.

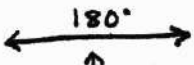
Vertex of an angle
In an angle, the endpoint is the vertex of the angle.



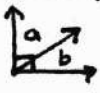
Acute angle; An angle that measures between 0° and 90°

Right angle: An angle that measures 90°

Obtuse angle: An angle that measures between 90° and 180°



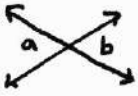
Straight angle: An angle that measures 180°



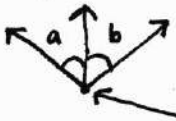
Complementary angles: Two angles whose sum is 90°

Supplementary angles: Two angles whose sum is 180°

Adjacent angles: Two angles that share a common vertex or side but have no common interior points



Vertical angles: Two angles are vertical angles if their sides form two pairs of opposite rays.



Congruent angles: Angles with the same measure

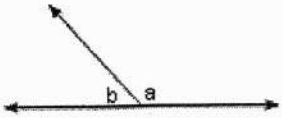
Angle bisector: A ray that divides an angle into two angles that are congruent

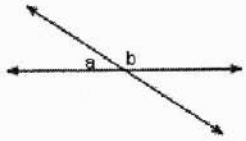
Perpendicular Bisector: A ray, line, or line segment that is perpendicular to another segment, and also splits the segment in half.

Special Angles

WALT: Identify special angle relationships.

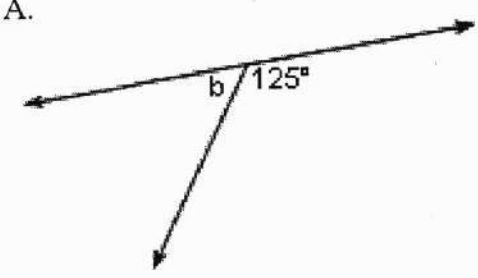
Two angles are **SUPPLEMENTARY ANGLES** if the sum of their measures is 180°.





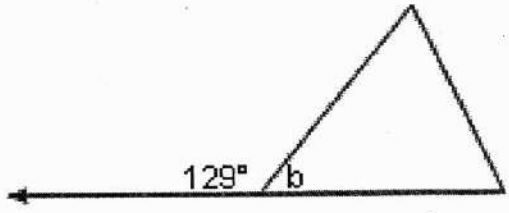
Example: What is the measure of $\angle b$?

A.

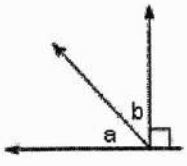


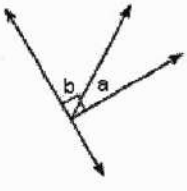
Guided Practice: What is the measure of $\angle b$?

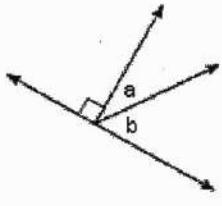
B.



Two angles **COMPLIMENTARY** if the sum of their measures is 90°.

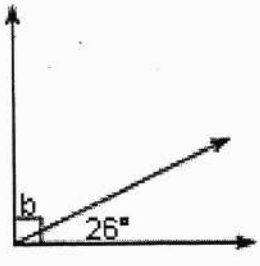






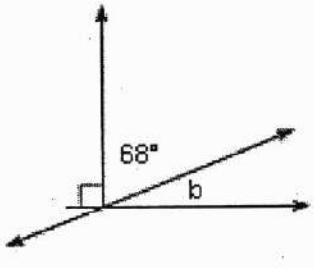
Example: What is the measure of $\angle b$?

A.



Guided Practice: What is the measure of $\angle b$?

B.

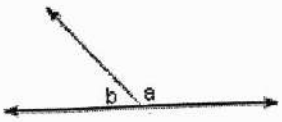


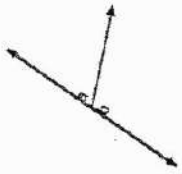
Special Angles

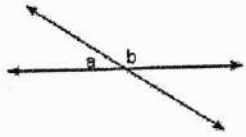
Geometry A
Answer Key

WALT: Identify special angle relationships.

Two angles are **SUPPLEMENTARY ANGLES** if the sum of their measures is 180°.

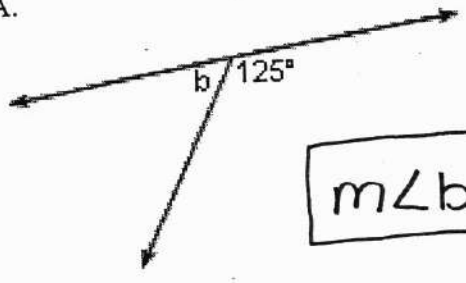






Example: What is the measure of $\angle b$?

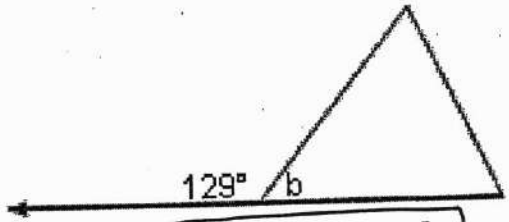
A.



$m\angle b = 55°$

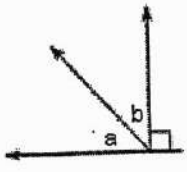
Guided Practice: What is the measure of $\angle b$?

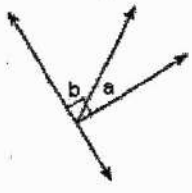
B.

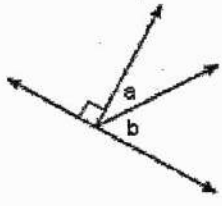


$m\angle b = 51°$

Two angles **COMPLIMENTARY** if the sum of their measures is 90°.

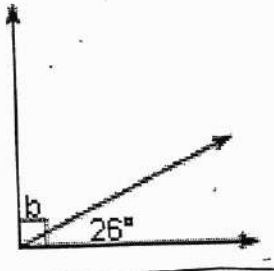






Example: What is the measure of $\angle b$?

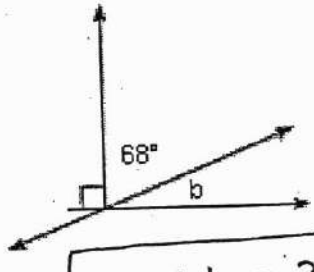
A.



$m\angle b = 64°$

Guided Practice: What is the measure of $\angle b$?

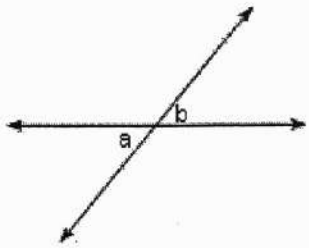
B.

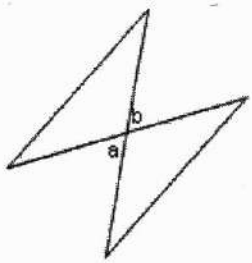


$m\angle b = 22°$

VERTICAL ANGLES are pairs of opposite angles that are formed when two lines or line segments intersect.

Vertical angles are congruent.

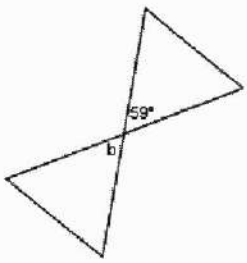




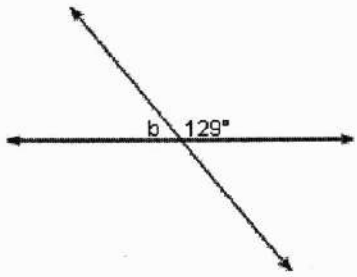
Example: What is the measure of $\angle b$?

Guided Practice: What is the measure of $\angle b$?

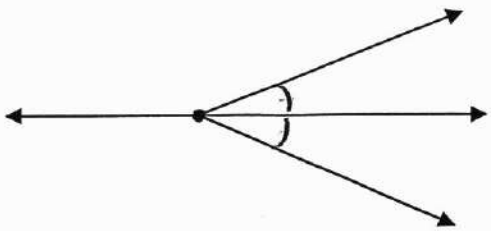
A.



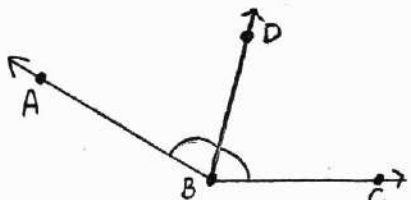
B.



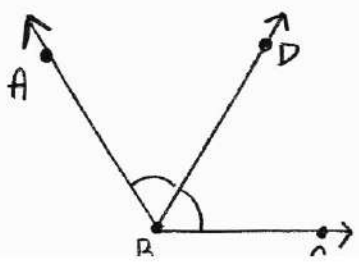
An **ANGLE BISECTOR** is a ray, line segment, or line that divides an angle into two congruent angles.



Example: Find the measure of $\angle ABD$ if the measure of $\angle ABC$ is 150°.

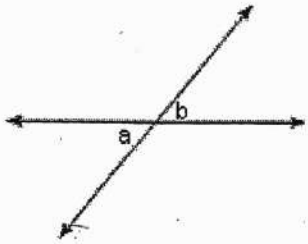


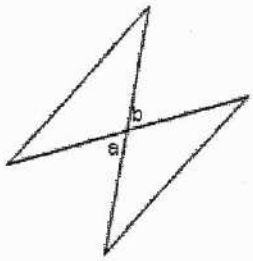
Guided Practice: Find the measure of $\angle ABC$ if the measure of $\angle ABD$ is 60°.



VERTICAL ANGLES are pairs of opposite angles that are formed when two lines or line segments intersect.

Vertical angles are congruent.

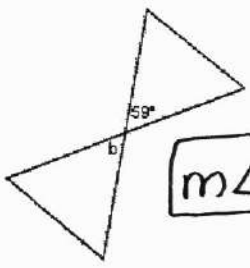




Example: What is the measure of $\angle b$?

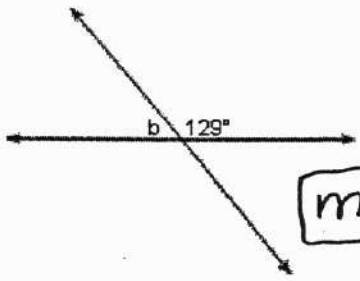
Guided Practice: What is the measure of $\angle b$?

A.



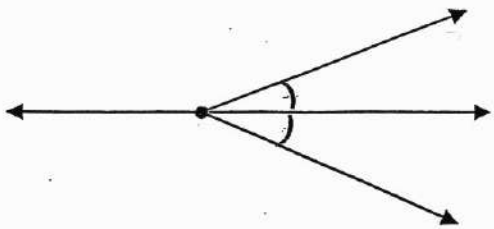
$m\angle b = 59°$

B.

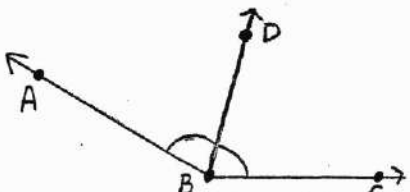


$m\angle b = 51°$

An **ANGLE BISECTOR** is a ray, line segment, or line that divides an angle into two congruent angles.

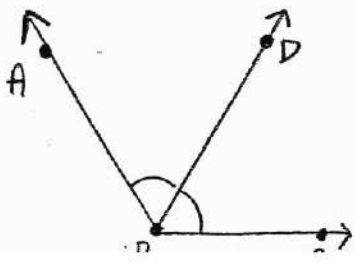


Example: Find the measure of $\angle ABD$ if the measure of $\angle ABC$ is 150°.



$m\angle ABD = 75°$

Guided Practice: Find the measure of $\angle ABC$ if the measure of $\angle ABD$ is 60°.

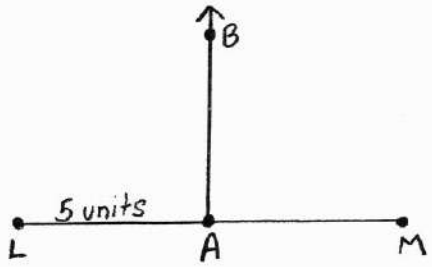


$m\angle ABC = 120°$

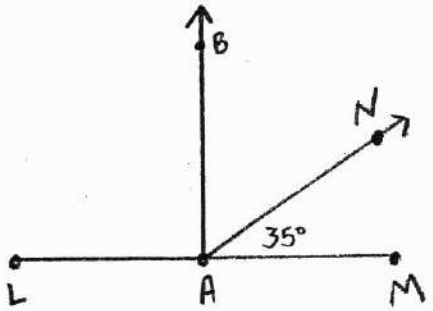
A **PERPENDICULAR BISECTOR** of a line segment is a line, line segment, or ray that is both perpendicular to the segment and bisects the segment.

- It is **perpendicular**, it forms right angles at the point of intersection.
- It **bisects** the segment, dividing it into two congruent segments.

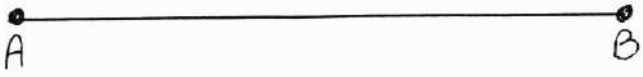
Example: A) In the figure below $\overleftrightarrow{AB}$ is a perpendicular bisector of $\overline{LM}$. What is the length of $\overline{AM}$?



Guided Practice: In the figure below $\overleftrightarrow{AB}$ is a perpendicular bisector of $\overline{LM}$. What is the measure of $\angle BAN$?



Using a protractor and ruler, create a perpendicular bisector to $\overline{AB}$.



Explain how you know your line, ray, or line segment is a perpendicular bisector.

A **PERPENDICULAR BISECTOR** of a line segment is a line, line segment, or ray that is both perpendicular to the segment and bisects the segment.

- It is **perpendicular**, it forms right angles at the point of intersection.
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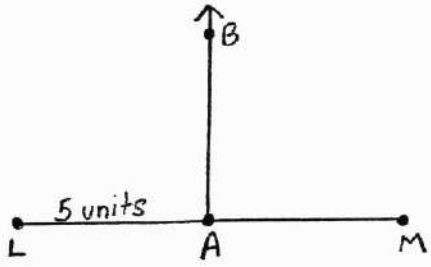
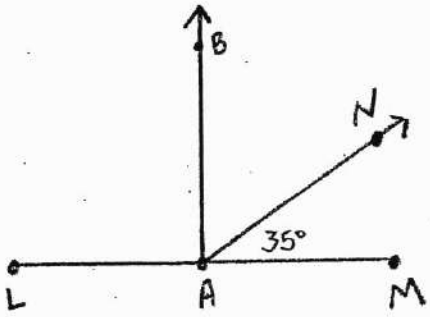
Example: A) In the figure below $\overline{AB}$ is a perpendicular bisector of $\overline{LM}$. What is the length of $\overline{AM}$?



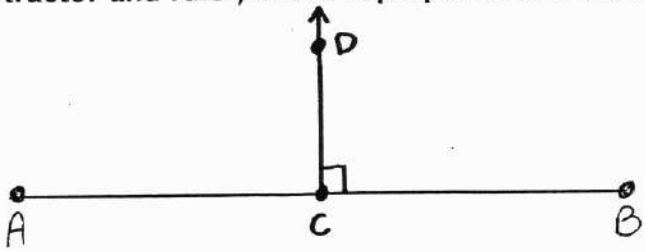
AM = 5 units

Guided Practice: In the figure below $\overline{AB}$ is a perpendicular bisector of $\overline{LM}$. What is the measure of $\angle BAN$?



m∠BAN = 55°

Using a protractor and ruler, create a perpendicular bisector to $\overline{AB}$.

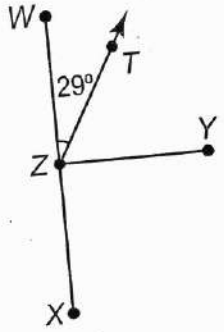


Explain how you know your line, ray, or line segment is a perpendicular bisector.

It splits $\overline{AB}$ into two congruent segments, and it forms a right angle.

OPEN-ENDED QUESTION

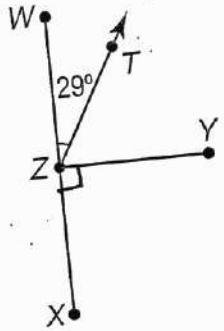
7. In this figure, $\overline{YZ}$ is a perpendicular bisector of $\overline{WX}$. Ray ZT divides angle WZY into two smaller angles.



- Find the measure, in degrees, of angle TZY.
- Explain how you used what you know about perpendicular bisectors and different types of angles to find the measure of $\angle TZY$.
- Is ray ZT a bisector of angle WZY? Explain how you know.

N-ENDED QUESTION

In this figure, $\overline{YZ}$ is a perpendicular bisector of $\overline{WX}$. Ray ZT divides angle WZY into two smaller angles.



- Find the measure, in degrees, of angle TZY.
- Explain how you used what you know about perpendicular bisectors and different types of angles to find the measure of $\angle TZY$.
- Is ray ZT a bisector of angle WZY? Explain how you know.

- $m\angle TZY = 61°$
- since $\overline{YZ}$ is a perpendicular bisector, we know it creates a right angle, so $m\angle WZY = 90°$. since $m\angle WZT = 29°$, we can do $90-29=61$ to find $m\angle TZY$.
- $\overrightarrow{ZT}$ is not an angle bisector. I know this because $m\angle WZT$ does not equal $m\angle TZY$.

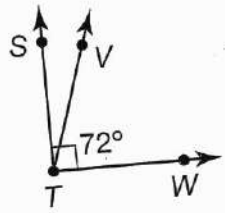
Lesson Practice

Choose the correct answer.

1. Which of the following could be the measures of two supplementary angles?

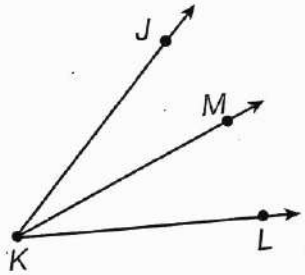
   A. 30° and 50°
   B. 30° and 60°
   C. 70° and 100°
   D. 70° and 110°

2. What is the measure of $\angle STV$ below?



   A. 18°
   B. 72°
   C. 90°
   D. 108°

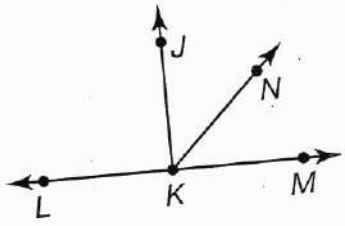
3. Ray KM bisects angle JKL. If the measure of $\angle JKL$ is 48°, what is the measure of $\angle JKM$?



   A. 12°
   B. 24°
   C. 48°
   D. 96°

Use this diagram for questions 4 and 5.

In the figure below, $\overrightarrow{JK}$ is a perpendicular bisector of $\overline{LM}$. Ray KN bisects $\angle JKM$.



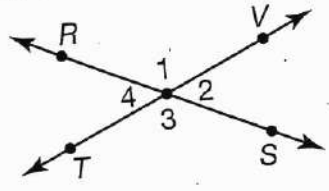
4. If $\overline{KM}$ is 8.2 units long, what is the length of $\overline{LM}$?

   A. 4.1 units
   B. 8.2 units
   C. 10.2 units
   D. 16.4 units

5. What is the measure of $\angle LKN$?

   A. 45°
   B. 90°
   C. 135°
   D. 180°

6. Lines RS and TV intersect to form angles 1, 2, 3, and 4. Which statement about the measures of these angles is NOT true?



   A. Angles 1 and 3 have equal measures.
   B. Angles 2 and 4 have equal measures.
   C. Angle 1 is supplementary to angle 3.
   D. Angle 1 is supplementary to angle 4.

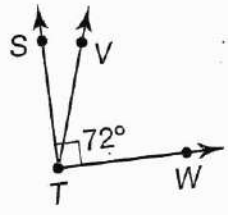
Lesson Practice

Choose the correct answer.

1. Which of the following could be the measures of two supplementary angles?

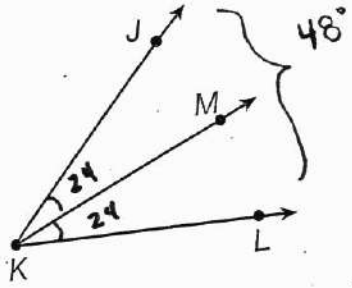
   A. 30° and 50°
   B. 30° and 60°
   C. 70° and 100°
   D. 70° and 110°

2. What is the measure of $\angle STV$ below?



   A. 18°
   B. 72°
   C. 90°
   D. 108°

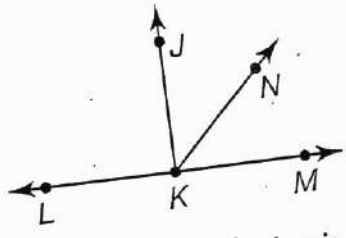
3. Ray KM bisects angle JKL. If the measure of $\angle JKL$ is 48°, what is the measure of $\angle JKM$?



   A. 12°
   B. 24°
   C. 48°
   D. 96°

Use this diagram for questions 4 and 5.

In the figure below, $\overrightarrow{JK}$ is a perpendicular bisector of $\overline{LM}$. Ray KN bisects $\angle JKM$.



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   A. 4.1 units
   B. 8.2 units
   C. 10.2 units
   D. 16.4 units

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   A. 45°
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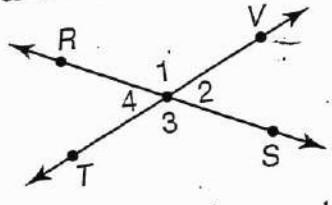
   C. 135°
   D. 180°

6. Lines RS and TV intersect to form angles 1, 2, 3, and 4. Which statement about the measures of these angles is NOT true?



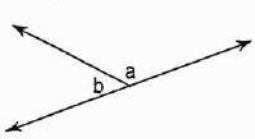
   A. Angles 1 and 3 have equal measures. ✓
   B. Angles 2 and 4 have equal measures. ✓
   C. Angle 1 is supplementary to angle 3.
   D. Angle 1 is supplementary to angle 4. ✓

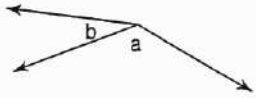
Kuta Software - Infinite Geometry Name_____

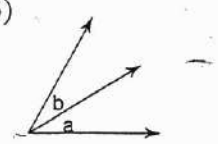
Angle Pair Relationships

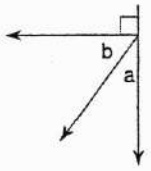
Date_____ Period____

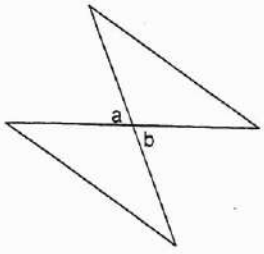
Name the relationship: complementary, linear pair, vertical, or adjacent.

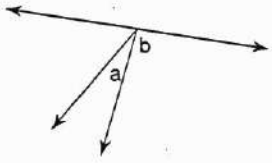
1) 

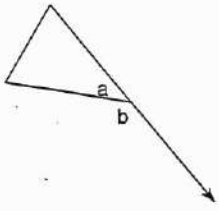
2) 

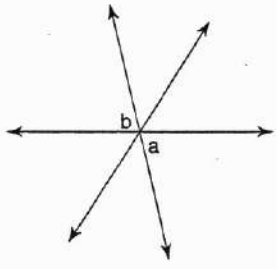
3) 

4) 

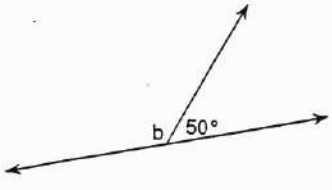
5) 

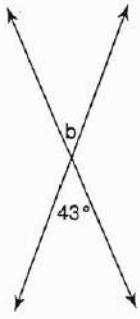
6) 

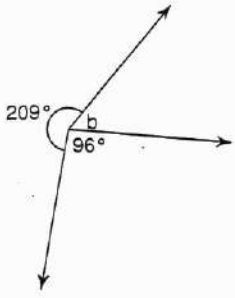
7) 

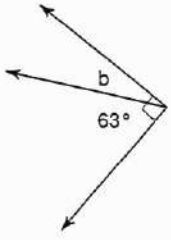
8) 

Find the measure of angle b.

9) 

10) 

11) 

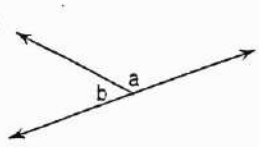
12) 

Name_____

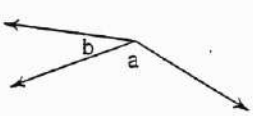
Angle Pair Relationships

Date_____ Period____

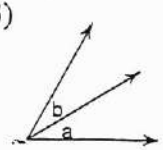
Name the relationship: complementary, linear pair, vertical, or adjacent.

1) 

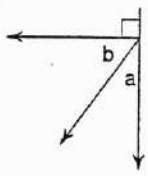
linear pair
adjacent

2) 

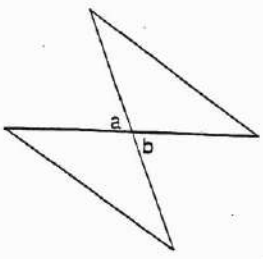
adjacent

3) 

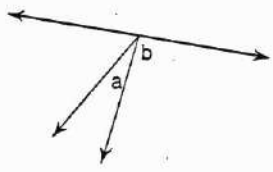
adjacent

4) 

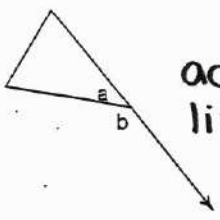
adjacent
complementary

5) 

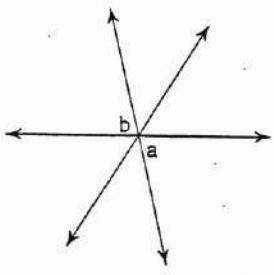
vertical

6) 

adjacent

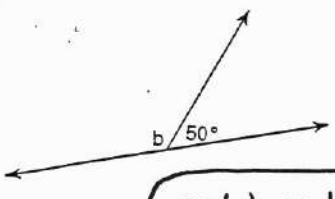
7) 

adjacent
linear pair

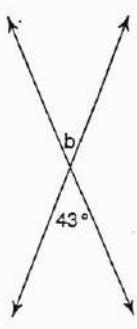
8) 

vertical

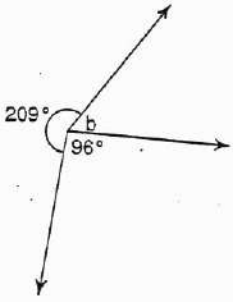
Find the measure of angle b.

9) 

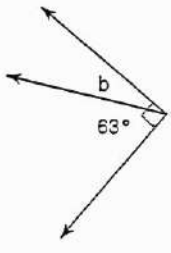
m∠b = 130°

10) 

m∠b = 43°

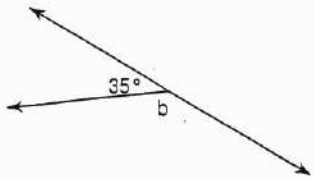
11) 

m∠b = 55°

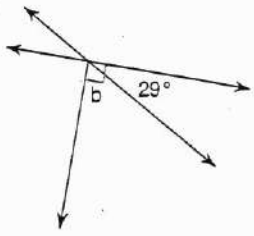
12) 

m∠B = 27°

13)



14)



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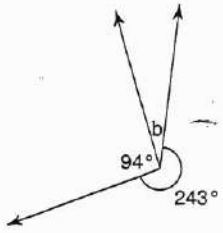

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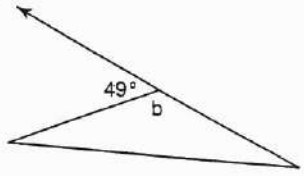

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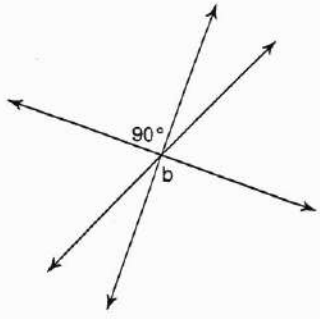

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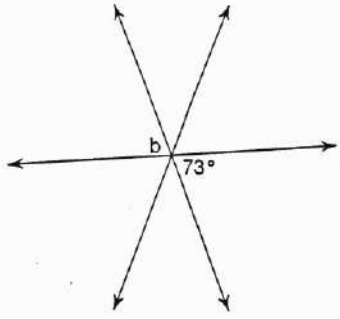
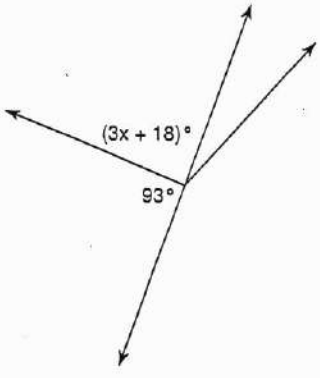
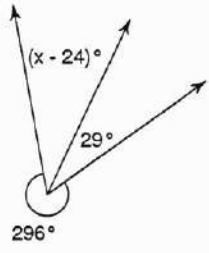


Find the value of x.

19)



20)



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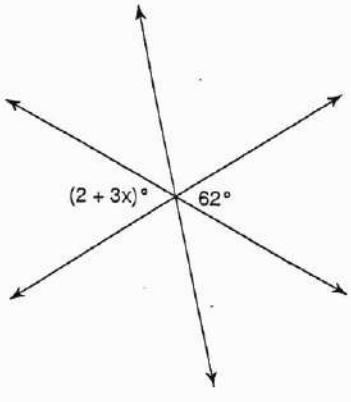

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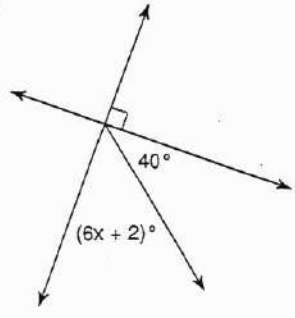

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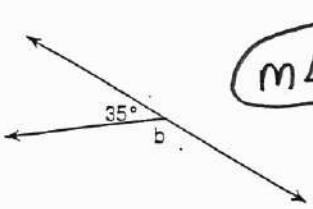
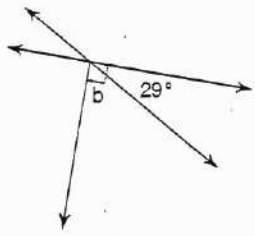


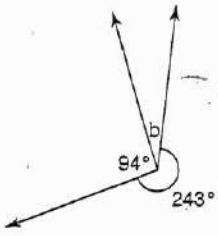
m∠b=145°

14)



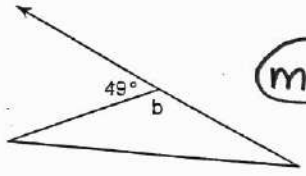
m∠b=61°

15)



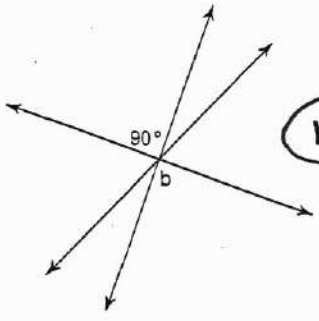
m∠b=23°

16)



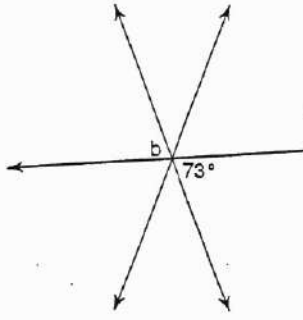
m∠b=131°

17)



m∠b=90°

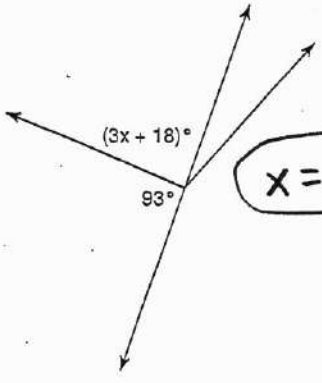
18)



m∠b=73°

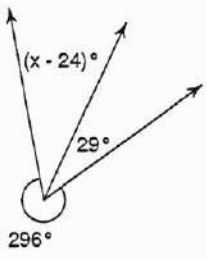
Find the value of x.

19)



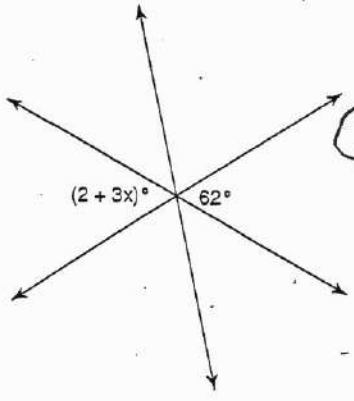
x=23

20)



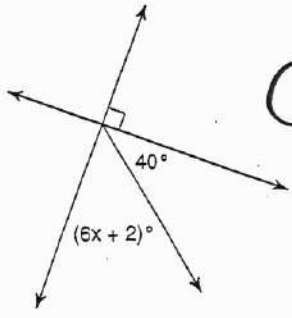
x=59

21)



x=20

22)



x=8