

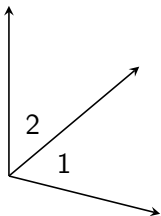
Exploring Angle Pairs

Objectives

Adjacent Angles

Two angles are adjacent if they

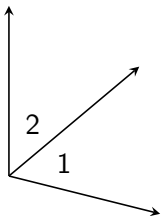
- Share a common side



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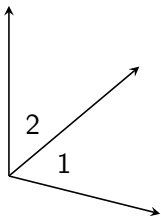
- Share a common side
- Share a common vertex



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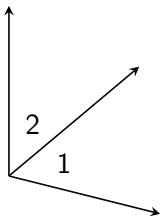
- Share a common side
- Share a common vertex
- Have no common interior points



Adjacent Angles

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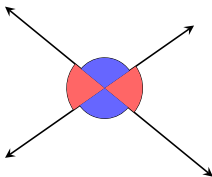
- Share a common side
- Share a common vertex
- Have no common interior points



$\angle 1$ and $\angle 2$ are adjacent angles.

Vertical Angles

Vertical angles are formed by 2 intersecting lines.



Complementary Angles

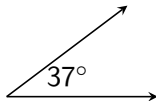
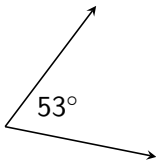
Complementary Angles

Two or more angles that add up to 90°

Complementary Angles

Complementary Angles

Two or more angles that add up to 90°



Supplementary Angles

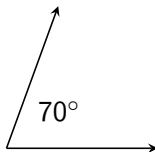
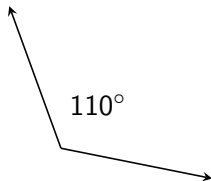
Supplementary Angles

Two or more angles that add up to 180°

Supplementary Angles

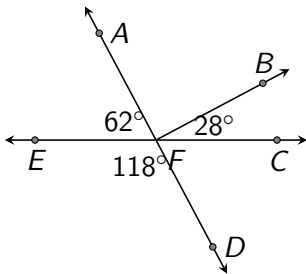
Supplementary Angles

Two or more angles that add up to 180°



Example 1

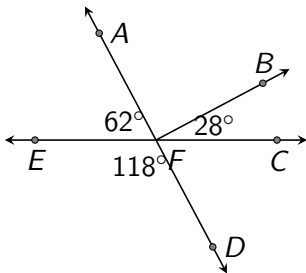
Use the diagram to determine if each statement is true.



- (a) $\angle BFD$ and $\angle AFB$ are adjacent angles.

Example 1

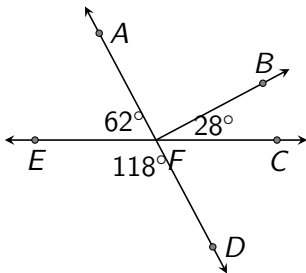
Use the diagram to determine if each statement is true.



- (a) $\angle BFD$ and $\angle AFB$ are adjacent angles. True

Example 1

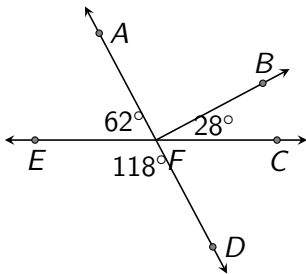
Use the diagram to determine if each statement is true.



- (a) $\angle BFD$ and $\angle AFB$ are adjacent angles. True
- (b) $\angle AFB$ and $\angle EFD$ are vertical angles.

Example 1

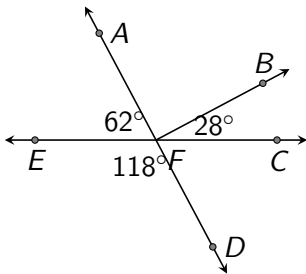
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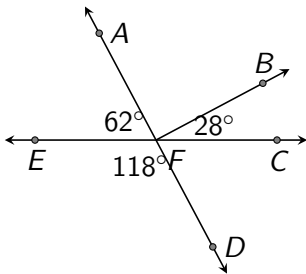
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- (a) $\angle BFD$ and $\angle AFB$ are adjacent angles. True
- (b) $\angle AFB$ and $\angle EFD$ are vertical angles. False
- (c) $\angle AFE$ and $\angle BFC$ are complementary.

Example 1

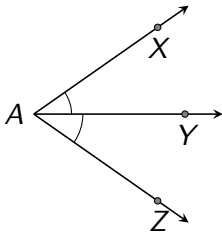
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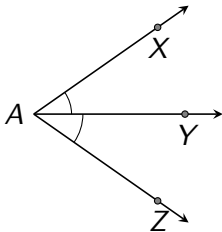
Angle Bisectors

An **angle bisector** is a ray (or segment) that divides an angle into 2 congruent angles.



Angle Bisectors

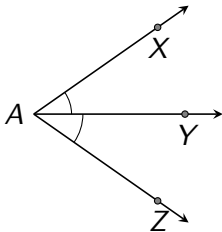
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\overrightarrow{AY} bisects $\angle XAZ$

Angle Bisectors

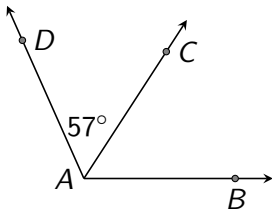
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\overrightarrow{AY} bisects $\angle XAZ \rightarrow \angle XAY \cong \angle ZAY$

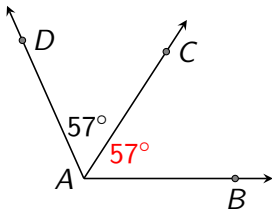
Example 2

- (a) \overrightarrow{AC} bisects $\angle DAB$. What is $m\angle DAB$?



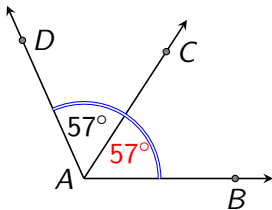
Example 2

- (a) \overrightarrow{AC} bisects $\angle DAB$. What is $m\angle DAB$?



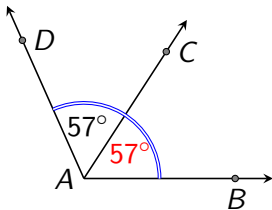
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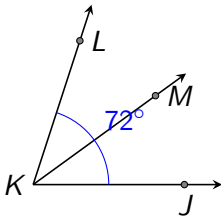
$$m\angle DAB = 114^\circ$$

Example 2

- (b) \overrightarrow{KM} bisects $\angle JKL$. If $m\angle JKL = 72^\circ$, what is $m\angle JKM$?

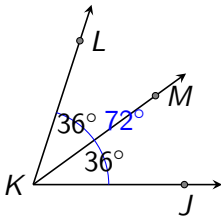
Example 2

- (b) \overrightarrow{KM} bisects $\angle JKL$. If $m\angle JKL = 72^\circ$, what is $m\angle JKM$?



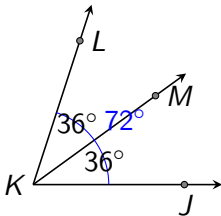
Example 2

- (b) \overrightarrow{KM} bisects $\angle JKL$. If $m\angle JKL = 72^\circ$, what is $m\angle JKM$?



Example 2

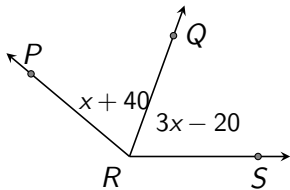
- (b) \overrightarrow{KM} bisects $\angle JKL$. If $m\angle JKL = 72^\circ$, what is $m\angle JKM$?



$$m\angle JKM = 36^\circ$$

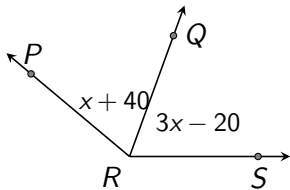
Example 2

(c) In the diagram, RQ bisects $\angle PRS$. Find the value of x .



Example 2

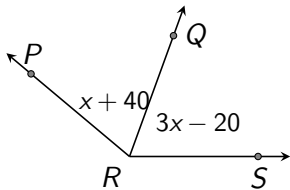
- (c) In the diagram, RQ bisects $\angle PRS$. Find the value of x .



$$x + 40 = 3x - 20$$

Example 2

(c) In the diagram, RQ bisects $\angle PRS$. Find the value of x .

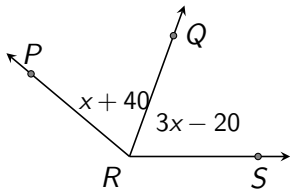


$$x + 40 = 3x - 20$$

$$40 = 2x - 20$$

Example 2

(c) In the diagram, RQ bisects $\angle PRS$. Find the value of x .



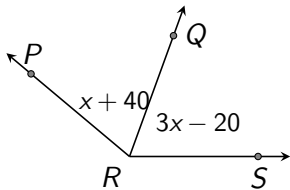
$$x + 40 = 3x - 20$$

$$40 = 2x - 20$$

$$60 = 2x$$

Example 2

(c) In the diagram, RQ bisects $\angle PRS$. Find the value of x .



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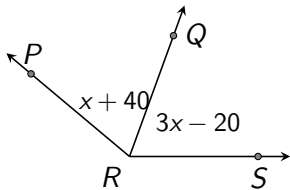
$$40 = 2x - 20$$

$$60 = 2x$$

$$x = 30$$

Example 2

(c) In the diagram, RQ bisects $\angle PRS$. Find the value of x .



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$$40 = 2x - 20$$

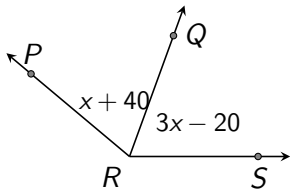
$$60 = 2x$$

$$x = 30$$

Check:

Example 2

(c) In the diagram, RQ bisects $\angle PRS$. Find the value of x .



$$x + 40 = 3x - 20$$

$$40 = 2x - 20$$

$$60 = 2x$$

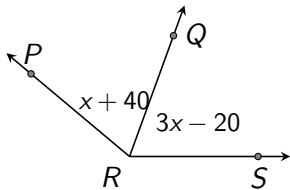
$$x = 30$$

Check:

$$30 + 40 \stackrel{?}{=} 3(30) - 20?$$

Example 2

(c) In the diagram, RQ bisects $\angle PRS$. Find the value of x .



$$x + 40 = 3x - 20$$

$$40 = 2x - 20$$

$$60 = 2x$$

$$x = 30$$

Check:

$$30 + 40 \stackrel{?}{=} 3(30) - 20?$$

$$70 = 70$$

Linear Pairs

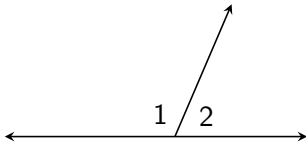
Linear Pair

A **linear pair** are two adjacent angles whose non-common sides form a line.

Linear Pairs

Linear Pair

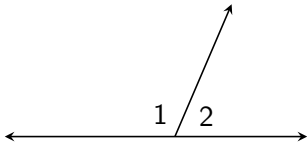
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Linear Pairs

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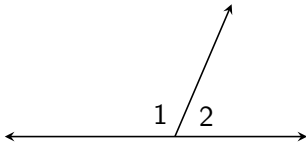


Angles 1 and 2 form a linear pair.

Linear Pairs

Linear Pair

A **linear pair** are two adjacent angles whose non-common sides form a line.

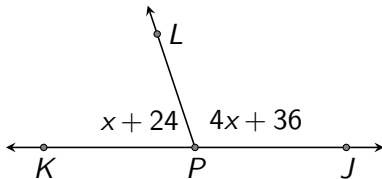


Angles 1 and 2 form a linear pair.

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

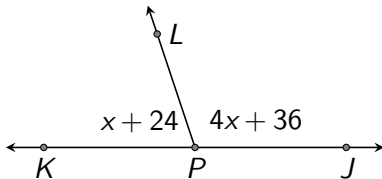
Example 3

- (a) Find the $m\angle KPL$ and $m\angle JPL$ in the diagram.



Example 3

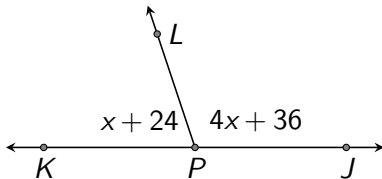
- (a) Find the $m\angle KPL$ and $m\angle JPL$ in the diagram.



$$x + 24 + 4x + 36 = 180$$

Example 3

- (a) Find the $m\angle KPL$ and $m\angle JPL$ in the diagram.

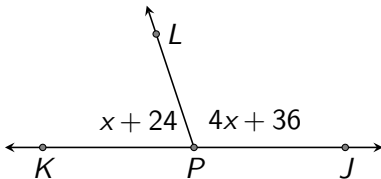


$$x + 24 + 4x + 36 = 180$$

$$5x + 60 = 180$$

Example 3

- (a) Find the $m\angle KPL$ and $m\angle JPL$ in the diagram.



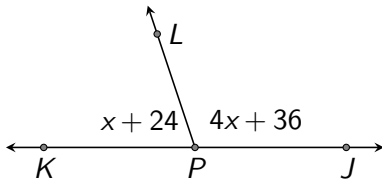
$$x + 24 + 4x + 36 = 180$$

$$5x + 60 = 180$$

$$5x = 120$$

Example 3

- (a) Find the $m\angle KPL$ and $m\angle JPL$ in the diagram.



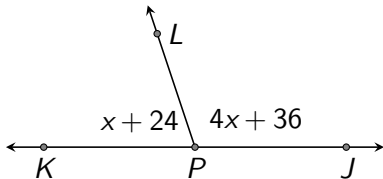
$$x + 24 + 4x + 36 = 180$$

$$5x + 60 = 180$$

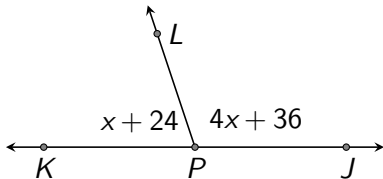
$$5x = 120$$

$$x = 24$$

Example 3a $x = 24$



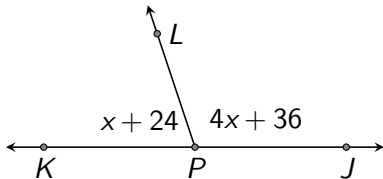
Example 3a $x = 24$



$$m\angle KPL = 24 + 24$$

$$m\angle JPL = 4(24) + 36$$

Example 3a $x = 24$



$$m\angle KPL = 24 + 24$$

$$m\angle KPL = 48^\circ$$

$$m\angle JPL = 4(24) + 36$$

$$m\angle JPL = 132^\circ$$