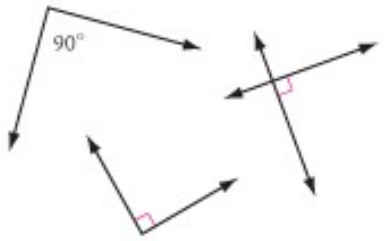
Lesson 1.3 – What's a Widget?

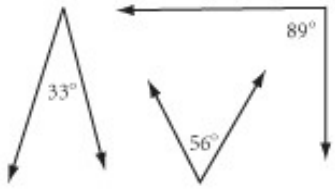
This lesson concentrates on your ability to write your own definition. To create a good definition, you should:

- Classify your term. What is it? (i.e. a square, a four-sided figure)
- Differentiate your term. How does it differ from others in that class? (i.e. that has four congruent sides and four right angles)
- Test your definition by looking for a counterexample.

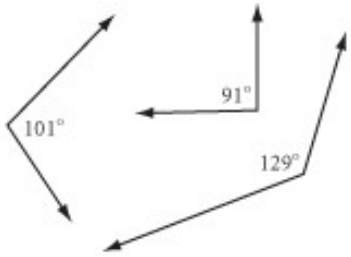
Right Angle - A right angle is an angle that measures exactly 90 degrees.



Acute Angle - An acute angle measures less than 90 degrees.

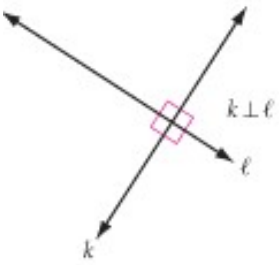


Obtuse Angle - An obtuse angle measures greater than 90 degrees.

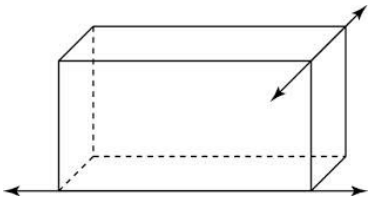


Parallel Lines - Parallel lines are lines in the same plane that never meet. Parallel lines are indicated by the same number of arrows on each line or a || between the line names.

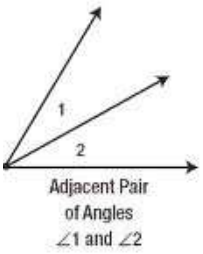
Perpendicular Lines - Perpendicular lines are lines that meet at 90-degree (or right) angles. Perpendicular lines are indicated using a right-angle symbol or a ⊥ between the line names.



Skew Lines - Skew lines are two lines that do not intersect and are noncoplanar. Remember that noncoplanar means that the lines are not in the same plane.

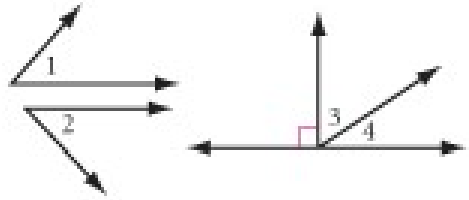


Adjacent Angles - Adjacent angles are angles that share a vertex and a side.



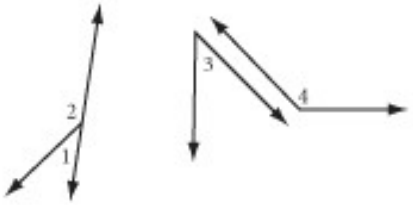
Complimentary Angles - Complementary angles are angles whose measures add to 90 degrees.

$m\angle 1 + m\angle 2 = 90°$

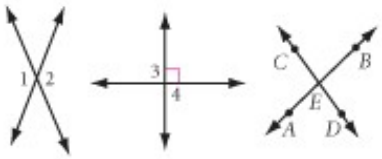


Supplementary Angles - Supplementary angles are angles whose measures add to 180 degrees.

$m\angle 3 + m\angle 4 = 180°$



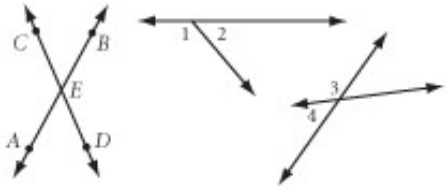
Vertical Angles - Vertical angles are angles formed by two intersecting lines. The angles share a common vertex but no common side.



Pairs of vertical angles:

$\angle 1$ and $\angle 2$
$\angle 3$ and $\angle 4$
$\angle AED$ and $\angle BEC$
$\angle AEC$ and $\angle DEB$

Linear Pair of Angles - Two angles are a linear pair if they share a vertex and a common side (adjacent angles) and their noncommon sides form a line.

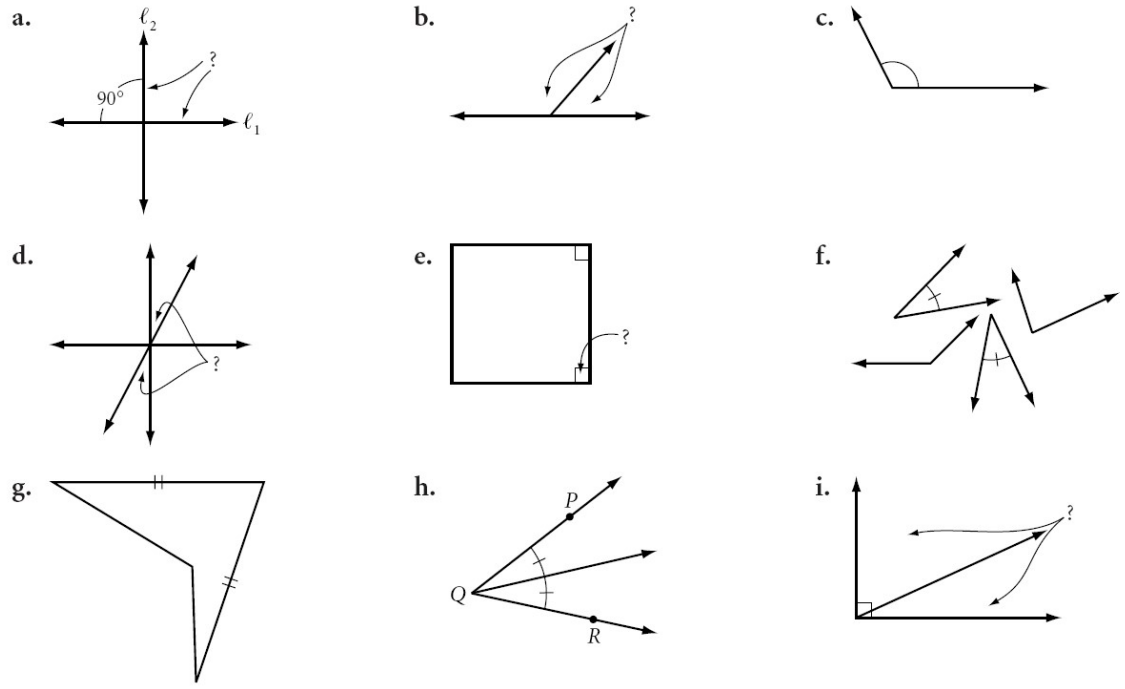


Linear pairs of angles:

$\angle 1$ and $\angle 2$
$\angle 3$ and $\angle 4$
$\angle AED$ and $\angle AEC$
$\angle BED$ and $\angle DEA$

**A linear pair of angles is always supplementary, but supplementary angles are not always linear pairs of angles.

Example 1: Match the term with the correct item

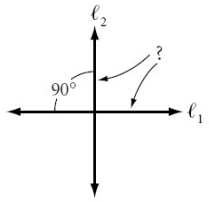


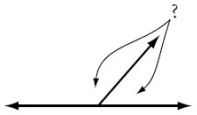
Vertical Angles

Vertical angles require intersecting lines. Only (a) and (d) show pictures of intersecting lines. The arrows in (a) are pointing to the lines themselves. The arrows in (d) are pointing to angles that share a vertex but not a side (are across from each other when lines intersect).

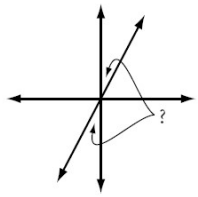
Our solution is d.

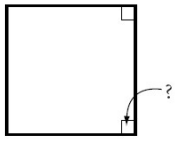
Example 2: Match the term with the correct item

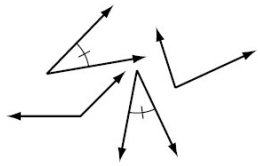
a. 

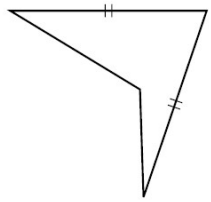
b. 

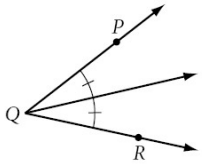
c. 

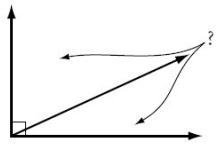
d. 

e. 

f. 

g. 

h. 

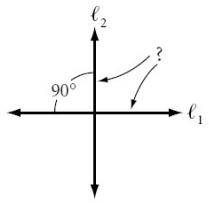
i. 

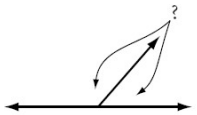
Obtuse Angle

Several of the images depict obtuse (angles that measure more than 90-degrees). However, (c) is an image of one angle that is obtuse.

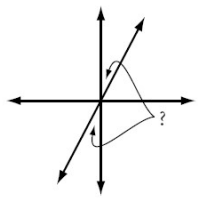
Our solution is c.

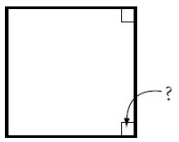
Example 3: Match the term with the correct item

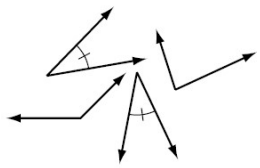
a. 

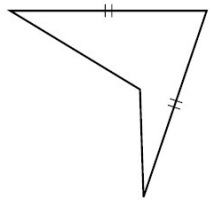
b. 

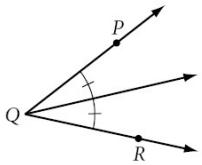
c. 

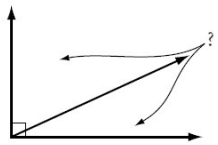
d. 

e. 

f. 

g. 

h. 

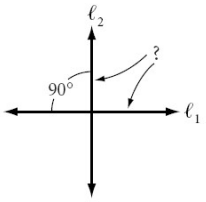
i. 

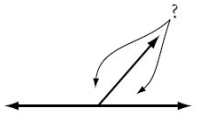
Right Angle

Multiple images depict right angles. The only image in which the arrow points to the right angle is (e).

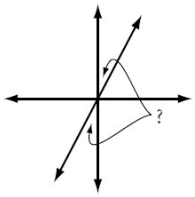
Our solution is e.

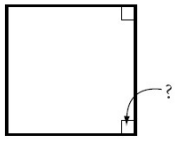
Example 4: Match the term with the correct item

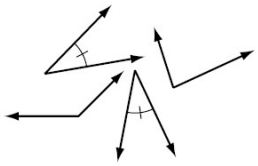
a. 

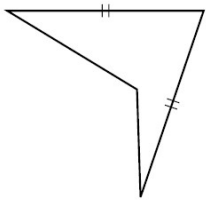
b. 

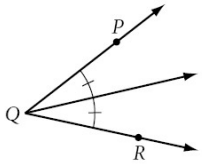
c. 

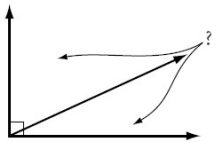
d. 

e. 

f. 

g. 

h. 

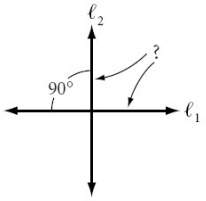
i. 

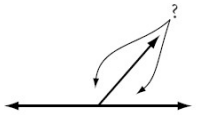
Complementary Angles

Complementary angles are angles that add to 90-degrees. The image that has arrows pointing to two angles that combine to make a right angle is (i).

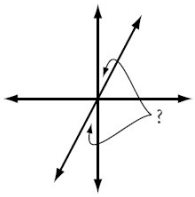
Our solution is i.

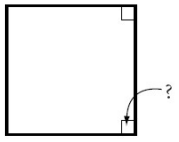
Example 5: Match the term with the correct item

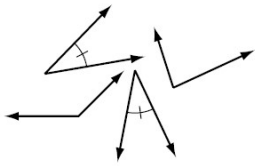
a. 

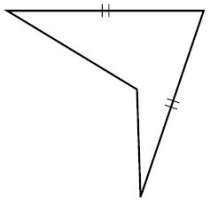
b. 

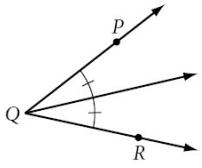
c. 

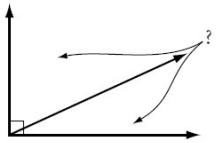
d. 

e. 

f. 

g. 

h. 

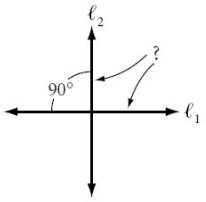
i. 

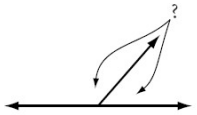
Congruent Angles

Multiple images depict congruent angles. However, let's choose the one with the simplest version of angles that are separate and marked congruent which is image (f).

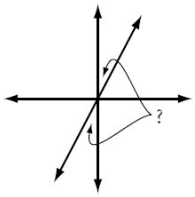
Our solution is f.

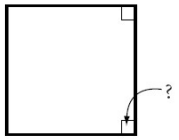
Example 6: Match the term with the correct item

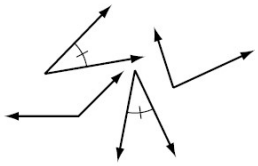
a. 

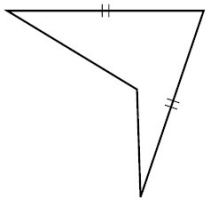
b. 

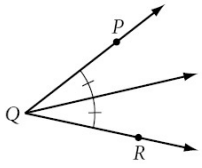
c. 

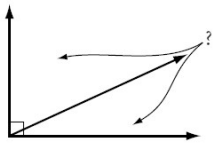
d. 

e. 

f. 

g. 

h. 

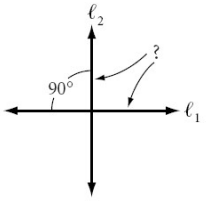
i. 

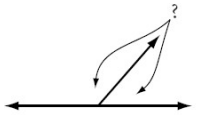
Linear Pair of Angles

A linear pair of angles should be angles that are adjacent and supplementary. (b) points to two angles that share a side and a vertex and add to 180-degrees or a line.

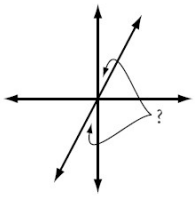
Our solution is b.

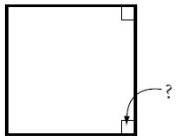
Example 7: Match the term with the correct item

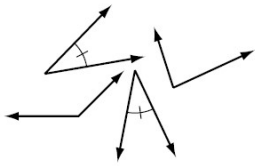
a. 

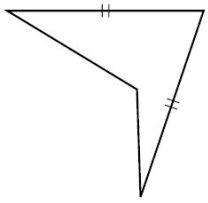
b. 

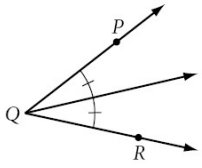
c. 

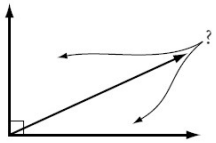
d. 

e. 

f. 

g. 

h. 

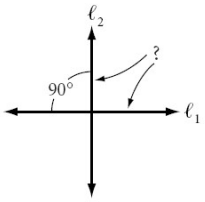
i. 

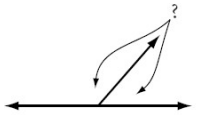
Bisected Angle

A bisected angle is an angle that has been cut in half by a ray. (h) shows an angle that has been cut in half. We know it is a bisector because the angles on both sides are congruent.

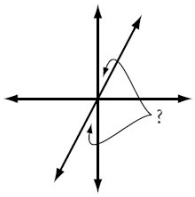
Our solution is h.

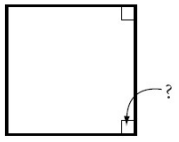
Example 8: Match the term with the correct item

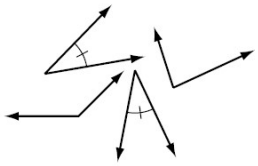
a. 

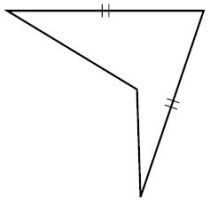
b. 

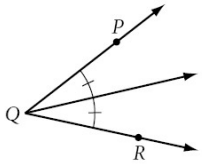
c. 

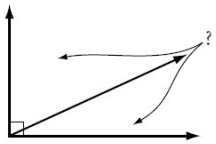
d. 

e. 

f. 

g. 

h. 

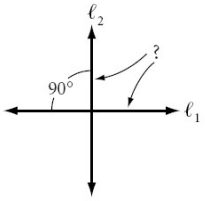
i. 

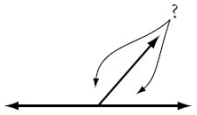
Perpendicular Lines

Perpendicular lines are lines that meet at right angles. The only image in which the arrows point to two lines that meet at a right angle is (a).

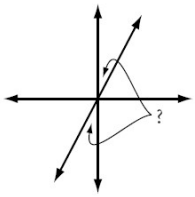
Our solution is a.

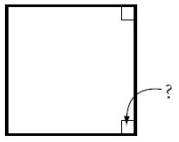
Example 9: Match the term with the correct item

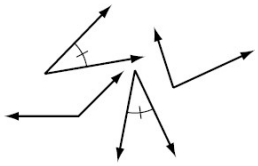
a. 

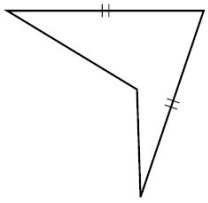
b. 

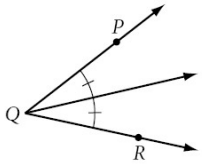
c. 

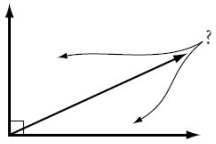
d. 

e. 

f. 

g. 

h. 

i. 

Congruent Segments

The only image in which the two line segments are marked with tick marks is (g).

Our solution is g.

Example 10: Complete

If $m\angle P = 13°, m\angle Q = 77°$, and $\angle Q$ and $\angle R$ are complementary, what can you conclude about $\angle P$ and $\angle R$? Explain your reasoning.

Let's start with $\angle P$ and $\angle Q$. If we add their measures together $(13 + 77 = 90)$, we can see that $\angle P$ and $\angle Q$ are complementary angles.

We are told that $\angle Q$ and $\angle R$ are complementary. We know that the measure of $\angle Q$ and $\angle R$ must add to 90-degrees, and $m\angle Q = 77°$. So, $m\angle Q + m\angle R = 90°$

$$77° + m\angle R = 90°$$

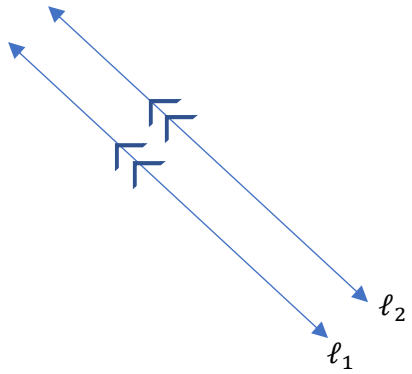
$$m\angle R = 13°$$

We are asked what we can conclude about $\angle P$ and $\angle R$. At this point, we know that both angles have a measure of 13°. So, we can conclude that the angles are congruent $(\angle P \cong \angle R)$.

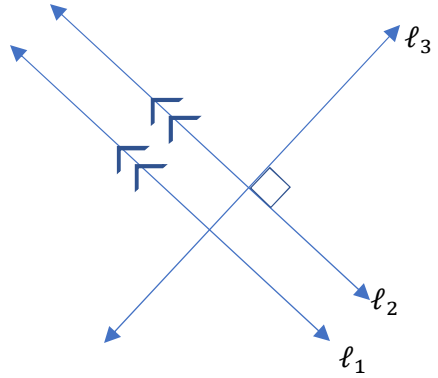
Example 11: Sketch, label, and mark a figure showing the properties listed

$\ell_1 || \ell_2, \ell_2 \perp \ell_3$

Let's start with $\ell_1 || \ell_2$. The "||" symbol means parallel lines. So, let's draw two lines that are parallel and mark them parallel (arrows on each line), and name the lines.



Now, let's add in $\ell_2 \perp \ell_3$. The "⊥" symbol means perpendicular lines. I already have a line ℓ_2 in my figure. So, I need to draw in line ℓ_3 so that it is perpendicular (meets at a 90-degree angle) to ℓ_2



Example 12: Sketch, label, and mark a figure showing the properties listed

$\overline{PQ} \perp \overrightarrow{PR}$

Let's draw in figure $\overline{PQ}$. We know because of the marking on the top of the name, that PQ should be a line segment with endpoints P and Q.

We know that $\overrightarrow{PR}$ is a ray with endpoint P. Since we already have point P in our figure, we have to work from the point already in our figure. The "⊥" symbol means perpendicular. So, we need to draw a ray from point P through R that makes a 90-degree angle with the segment in our figure.