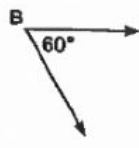
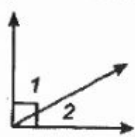


**Complementary angles** are angles whose sum is  $90^\circ$ . Example:



Complementary angles:  $\angle 1$  and  $\angle 2$   $\angle A$  and  $\angle B$

Note: The two acute angles in a right triangle are complementary angles:

$$x + y + 90^\circ = 180^\circ$$

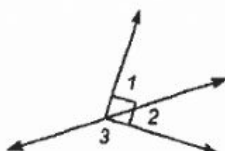
$$x + y = 180^\circ - 90^\circ$$

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



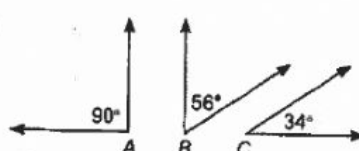
8. Find the complementary angles.

a)



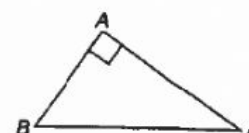
\_\_\_\_\_ and \_\_\_\_\_

b)



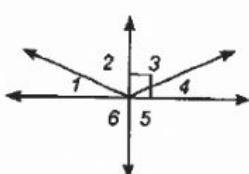
\_\_\_\_\_ and \_\_\_\_\_

c)



\_\_\_\_\_ and \_\_\_\_\_

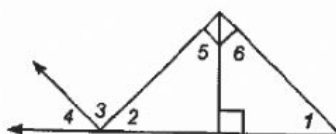
d)



\_\_\_\_\_ and \_\_\_\_\_

\_\_\_\_\_ and \_\_\_\_\_

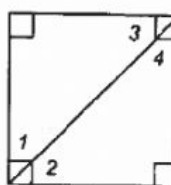
e)



$\angle 2$  and \_\_\_\_\_,  $\angle 2$  and \_\_\_\_\_

$\angle 6$  and \_\_\_\_\_,  $\angle 6$  and \_\_\_\_\_

f)

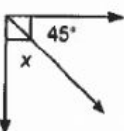


$\angle 1$  and \_\_\_\_\_,  $\angle 1$  and \_\_\_\_\_

$\angle 4$  and \_\_\_\_\_,  $\angle 4$  and \_\_\_\_\_

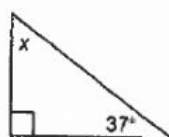
9. Find the value of  $x$ .

a)



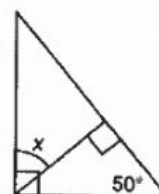
$\angle x =$  \_\_\_\_\_

b)



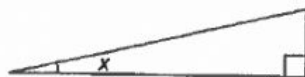
$\angle x =$  \_\_\_\_\_

c)



$\angle x =$  \_\_\_\_\_

10. In a right triangle, one acute angle is 4 times larger than the other acute angle. Finish the sketch and use equations to find both angles.

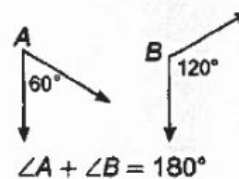
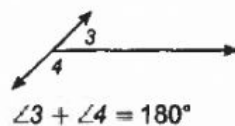
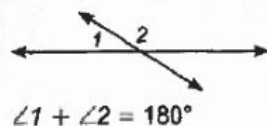


11. In a right triangle, one acute angle is  $20^\circ$  more than the other acute angle. Sketch the triangle and use equations to find both angles.

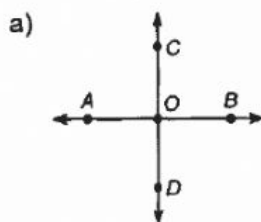
## G8-20 Supplementary and Opposite Angles

A straight angle measures  $180^\circ$ .

Supplementary angles are pairs of angles whose sum is  $180^\circ$ . Examples:



1. Find the supplementary angles in the graph.

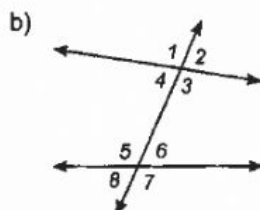


$\angle AOC + \underline{\hspace{1cm}} = 180^\circ$

$\angle AOC + \underline{\hspace{1cm}} = 180^\circ$

$\angle AOD + \underline{\hspace{1cm}} = 180^\circ$

$\angle BOD + \underline{\hspace{1cm}} = 180^\circ$

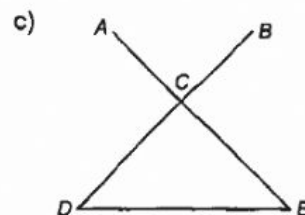


$\angle 2 + \underline{\hspace{1cm}} = 180^\circ$ ,  $\angle 6 + \underline{\hspace{1cm}} = 180^\circ$

$\angle 2 + \underline{\hspace{1cm}} = 180^\circ$ ,  $\angle 6 + \underline{\hspace{1cm}} = 180^\circ$

$\angle 4 + \underline{\hspace{1cm}} = 180^\circ$ ,  $\angle 8 + \underline{\hspace{1cm}} = 180^\circ$

$\angle 4 + \underline{\hspace{1cm}} = 180^\circ$ ,  $\angle 8 + \underline{\hspace{1cm}} = 180^\circ$



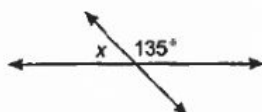
$\angle ACD + \underline{\hspace{1cm}} = 180^\circ$

$\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = 180^\circ$

$\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = 180^\circ$

$\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = 180^\circ$

Find  $\angle x$ :



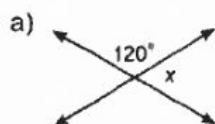
Solution:

$\angle x + 135^\circ = 180^\circ$  (Supplementary angles)

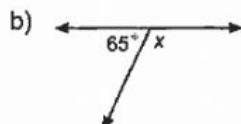
$\angle x = 180^\circ - 135^\circ$

$\angle x = 45^\circ$

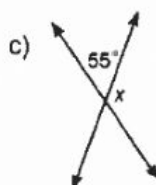
2. Find  $\angle x$  and  $\angle y$ , or  $\angle x + \angle y$ .



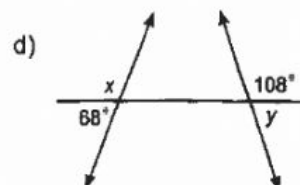
$\angle x = \underline{\hspace{1cm}}$



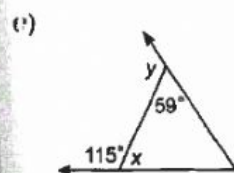
$\angle x = \underline{\hspace{1cm}}$



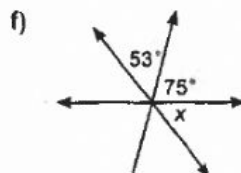
$\angle x = \underline{\hspace{1cm}}$



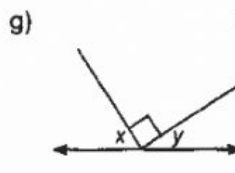
$\angle x = \underline{\hspace{1cm}}$ ,  $\angle y = \underline{\hspace{1cm}}$



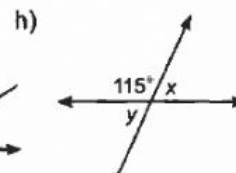
$\angle x = \underline{\hspace{1cm}}$ ,  $\angle y = \underline{\hspace{1cm}}$



$\angle x = \underline{\hspace{1cm}}$

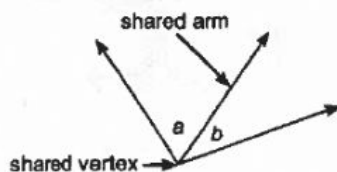


$\angle x + \angle y = \underline{\hspace{1cm}}$

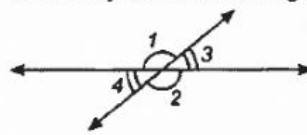


$\angle x = \underline{\hspace{1cm}}$ ,  $\angle y = \underline{\hspace{1cm}}$

**Adjacent angles** share a vertex and an arm.



**Opposite angles** are the non-adjacent angles formed by two intersecting lines.



$\angle 1$  and  $\angle 2$  are adjacent angles  
 $\angle 3$  and  $\angle 4$  are also adjacent angles

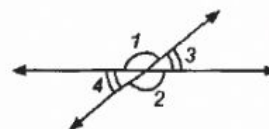
3. a) Which angles in this picture are supplementary angles?

\_\_\_\_\_ and \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_

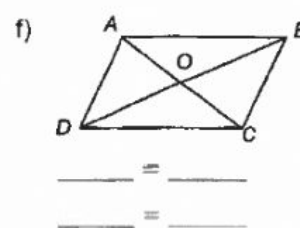
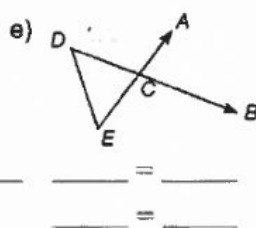
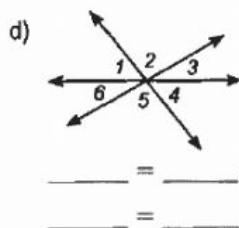
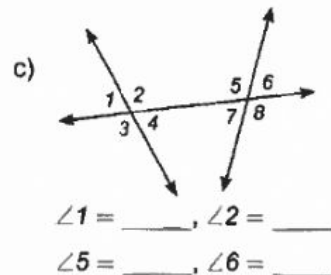
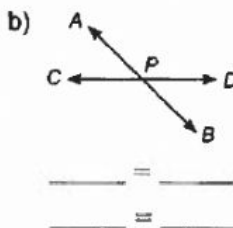
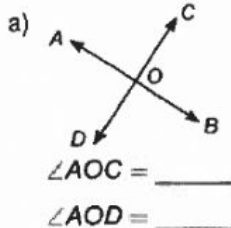
b)  $\angle 1 + \angle 3 = \underline{\hspace{1cm}}^\circ$ , so  $\angle 1 = \underline{\hspace{1cm}}$ .  $\angle 2 + \angle 4 = \underline{\hspace{1cm}}^\circ$ , so  $\angle 2 = \underline{\hspace{1cm}}$ .

What can you say about opposite angles and  $\angle 1$  and  $\angle 2$ ? \_\_\_\_\_

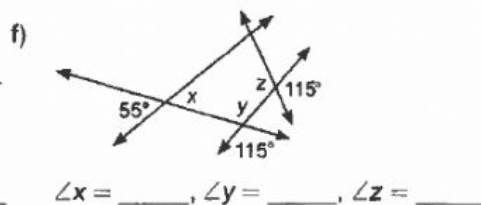
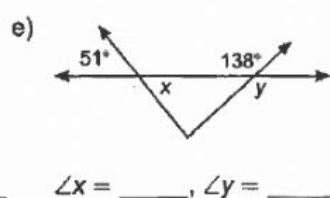
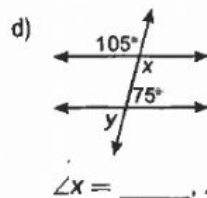
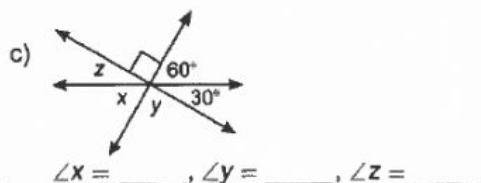
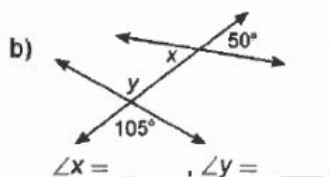
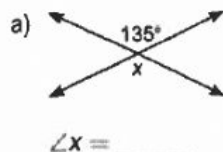
c) Explain why  $\angle 3 = \angle 4$ .



4. Find angles that are opposite (and equal).



5. Find the missing angles.

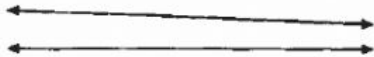


## G8-21 Parallel Lines

**Parallel lines** never intersect, no matter how far they are extended in either direction.



1. Extend both lines. Use a ruler. Do the lines intersect or are they parallel? \_\_\_\_\_



2. Match the lines below to the descriptions.

**A** The lines intersect.

**B** If the lines were extended far enough, they would intersect.

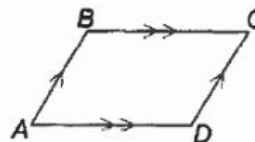
**C** The lines are parallel.



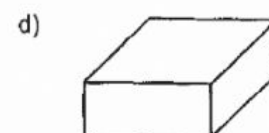
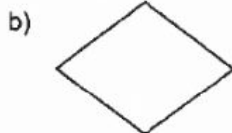
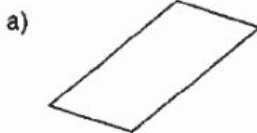
3. Give two examples of parallel lines in the world around you.

We mark parallel lines using arrow symbols ( $\rightarrow$ ,  $\Rightarrow$ , and so on). The  $\parallel$  symbol means "is parallel to."

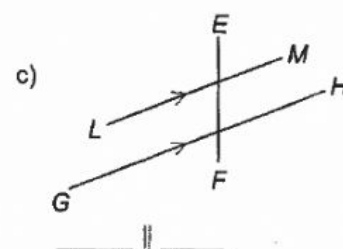
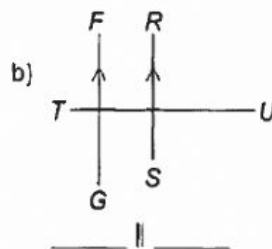
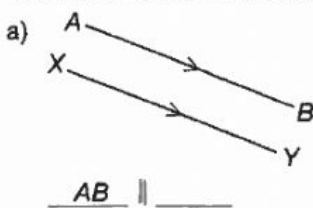
For example,  $AB \parallel CD$  or  $AB \parallel DC$ .



4. Use arrow symbols to mark the sides or edges of these shapes that look like they are parallel.



5. State which lines are parallel.



6. The lines  $AB$  and  $DE$  are parallel. Measure the line segments.

$AD = \underline{\hspace{2cm}}$        $BE = \underline{\hspace{2cm}}$        $CF = \underline{\hspace{2cm}}$

What do you notice? \_\_\_\_\_

