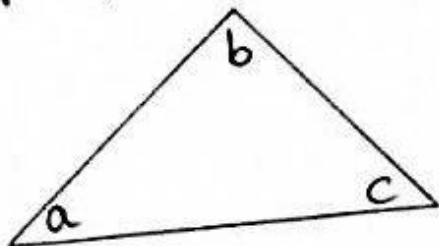


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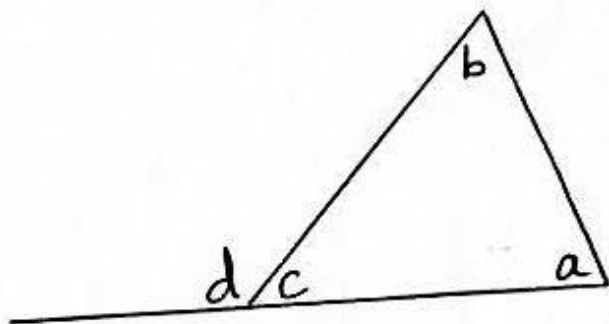
## Grade 9 Mathematics

Angle properties of a triangle.



$$a + b + c = 180^\circ$$

\*The sum of angles in a triangle is  $180^\circ$



$$a + b + c = 180^\circ \text{ (Angles in a triangle)}$$

$$c + d = 180^\circ \text{ (Angles on a straight line)}$$

Since  $(a + b) + c = 180^\circ$  and  $c + d = 180^\circ$ , then

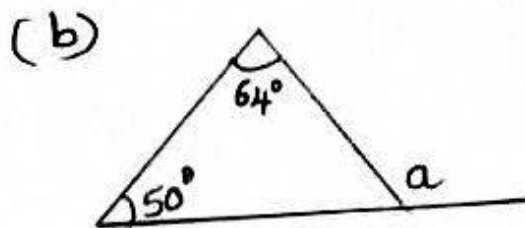
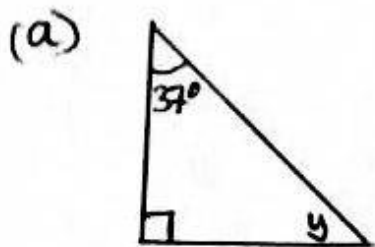
$$a + b = d.$$

\*The exterior angle of a triangle is equal to the sum of the opposite interior angles.

$$d = a + b.$$

## Examples

1. Calculate the angles marked with letters in each of the following:



2. The angles of a triangle are  $x$ ,  $y$  and  $z$ . If  $x = 24^\circ$  and  $z = 67^\circ$  calculate angle  $y$ .

### Solutions

1. (a)  $y + 37^\circ + 90^\circ = 180^\circ$  (angles in a triangle)  
 $y = 180^\circ - (37^\circ + 90^\circ)$   
 $y = 53^\circ$

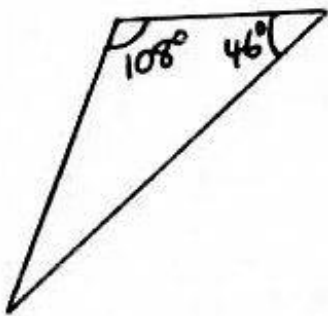
(b)  $a = 50^\circ + 64^\circ$  (exterior angle of a triangle)  
 $a = 114^\circ$

2.  $x + y + z = 180^\circ$   
 $24^\circ + y + 67^\circ = 180^\circ$   
 $y = 180^\circ - (24^\circ + 67^\circ)$   
 $y = 89^\circ$

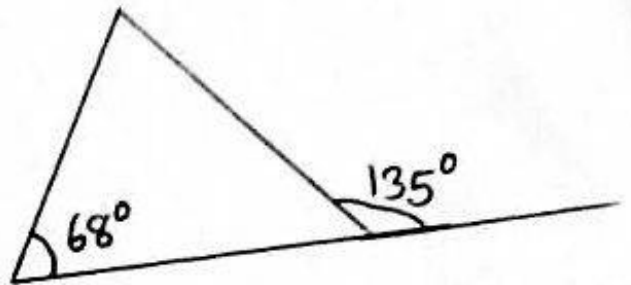
## Exercise

1. Calculate the missing angles in each of the following triangles:

(a)

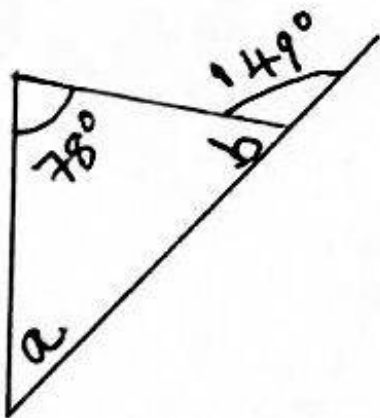


(b)

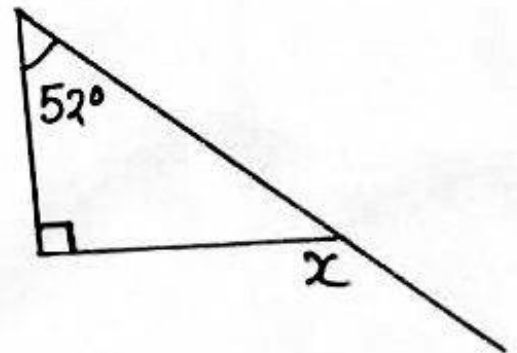


2. Find the angles marked with letters in each of the following:

(a)



(b)



3. The angles of a triangle are  $x$ ,  $2x$  and  $3x$ . Find the value of  $x$  and hence state the size of each angle.