

# **WorkBook**

## **GEOMETRY**

### **Deduction**

## **WorkNotes**

# WorkBook

## Table of Contents

(Click on links)

Vertically opposite angles

Straight angles

Angle of revolution

Corresponding angles

Alternate angles

Cointerior angles

Angle sum of a triangle

Isosceles and equilateral triangle

The exterior angle of a triangle

Angle sum of a quadrilateral is  $360^\circ$

Other properties of quadrilaterals

Interior angle sum of a polygon is given by the formula  $(n-2)180^\circ$

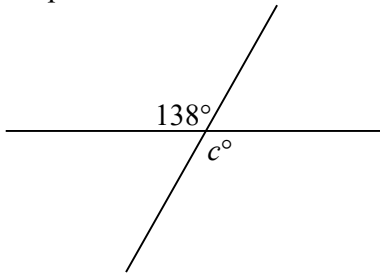
Exterior angle sum of a polygon is  $360^\circ$

Further examples

**WorkBook**  
**DEDUCTIVE GEOMETRY**

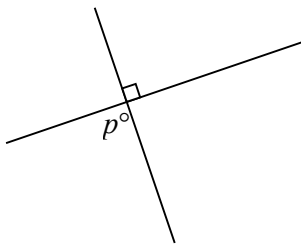
**Vertically opposite angles are equal.**

Example 1



$c = 138^\circ$  (Vertically opposite angles)

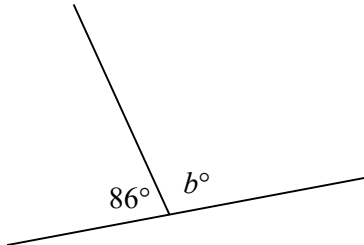
Example 2



$p = 90^\circ$  (Vertically opposite angles)

**Straight angles are supplementary. That is, they add to  $180^\circ$**

Example 3

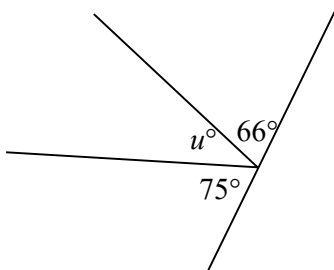


$b = 94^\circ$  (Straight angle)

$b^\circ + 86^\circ = 180^\circ$

$b = 94$

Example 4



$u = 39^\circ$  (Straight angle)

$u^\circ + 75^\circ + 66^\circ = 180^\circ$

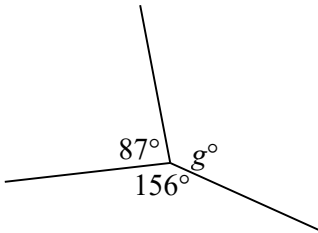
$u^\circ + 141^\circ = 180^\circ$

$u = 39$

# WorkBook

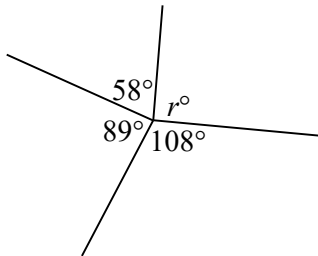
## Angle of revolution adds to $360^\circ$

Example 5



$$g = 117^\circ \text{ (Angle of revolution)}$$

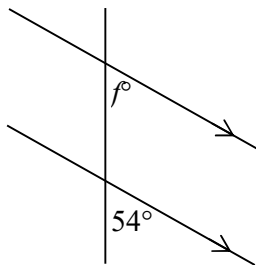
Example 6



$$r = 105^\circ \text{ (Angle of revolution)}$$

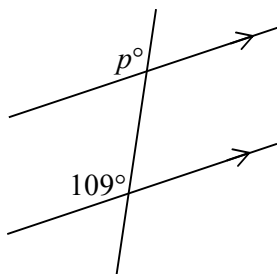
## Corresponding angles in parallel lines are equal.

Example 7



$$f = 54^\circ \text{ (Corresponding angles in parallel lines)}$$

Example 8

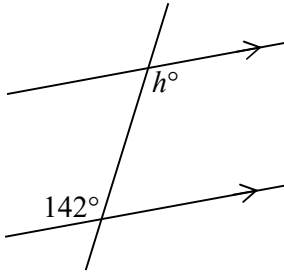


$$p = 109^\circ \text{ (Corresponding angles in parallel lines)}$$

# WorkBook

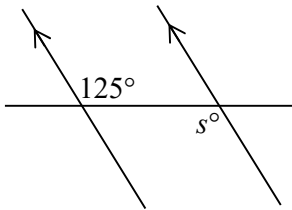
**Alternate angles in parallel lines are equal.**

Example 9



$h = 142^\circ$  (Alternate angles in parallel lines)

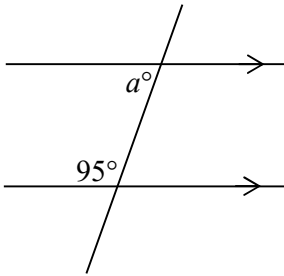
Example 10



$s = 125^\circ$  (Alternate angles in parallel lines)

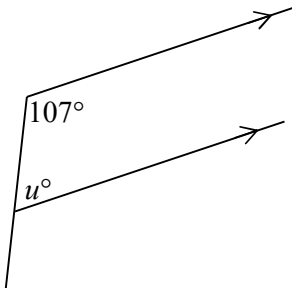
**Cointerior angles in parallel lines are supplementary. That is, they add to  $180^\circ$ .**

Example 11



$r = 85^\circ$  (Cointerior angles in parallel lines)

Example 12

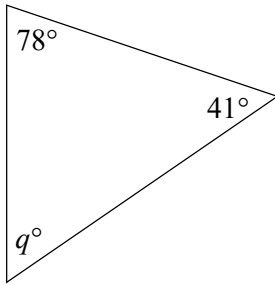


$u = 73^\circ$  (Cointerior angles in parallel lines)

## WorkBook

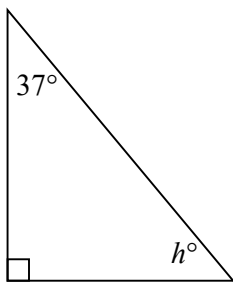
**Angle sum of a triangle is  $180^\circ$ .**

Example 13



$$q = 61^\circ \text{ (Angle sum of a triangle)}$$

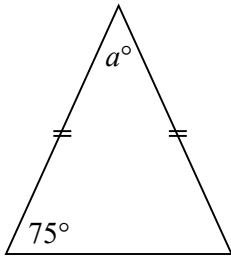
Example 14



$$h = 53^\circ \text{ (Angle sum of a triangle)}$$

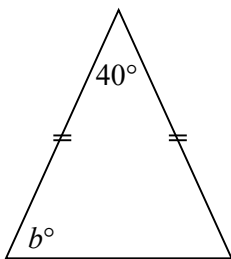
**Isosceles and equilateral triangle**

Example 15



$$a = 30^\circ \text{ (Angle sum of an isosceles triangle)}$$

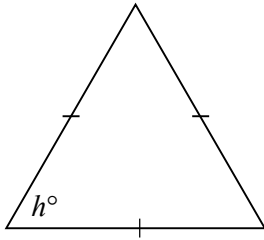
Example 16



$$r = 70^\circ \text{ (Angle sum of an isosceles triangle)}$$

# WorkBook

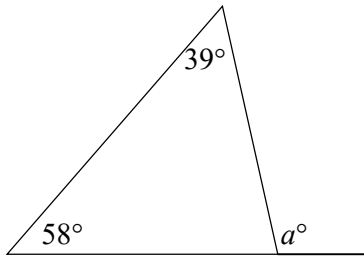
Example 17



$$r = 60^\circ \text{ (Angle of an equilateral triangle)}$$

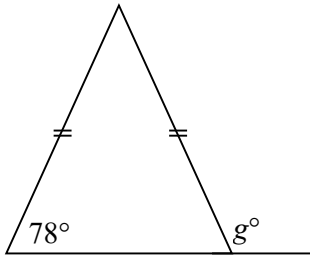
**The exterior angle of a triangle is equal to the sum of the remote interior angles.**

Example 18



$$a = 97^\circ \text{ (Exterior angle of a triangle)}$$

Example 19

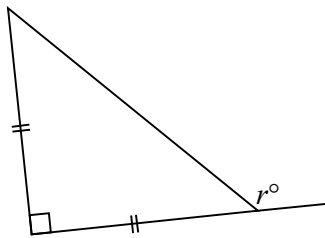


$$a = 102^\circ \text{ (Angle sum of an isosceles triangle and exterior angle of a triangle)}$$

OR

$$a = 102^\circ \text{ (Equal angles in an isosceles triangle and straight angle)}$$

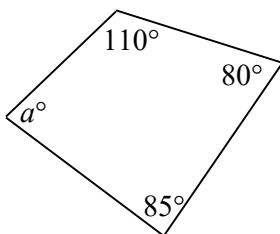
Example 20



$$r = 135^\circ \text{ (Exterior angle of an isosceles right-angled triangle)}$$

**Angle sum of a quadrilateral is  $360^\circ$**

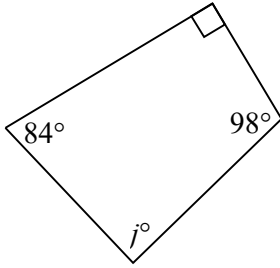
Example 21



$$a = 85^\circ \text{ (Angle sum of a quadrilateral)}$$

## WorkBook

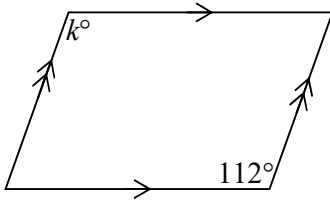
Example 22



$$r = 88^\circ \text{ (Angle sum of a quadrilateral)}$$

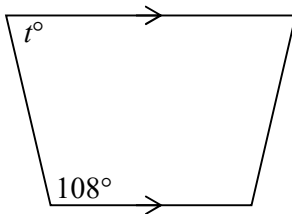
### Other properties of quadrilaterals

Example 23



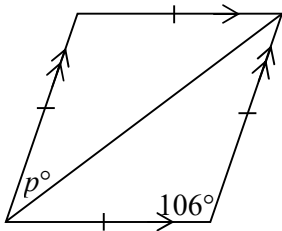
$$a = 112^\circ \text{ (Opposite angles in a parallelogram)}$$

Example 24



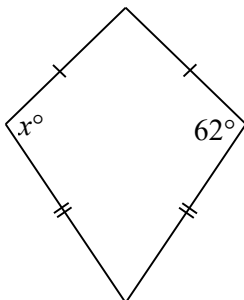
$$r = 72^\circ \text{ (co-interior angles in parallel lines)}$$

Example 25



$$p = 37^\circ \text{ (angle sum and diagonals bisect angles in a rhombus)}$$

Example 26



$$x = 62^\circ \text{ (Opposite equal angles of a kite)}$$



## WorkBook

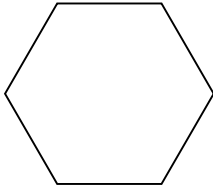
**Interior angle sum of a polygon is given by the formula  $(n-2)180^\circ$**

Angle sum =  $(n-2)180^\circ$  where  $n$  is the number of sides

OR

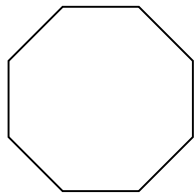
Angle sum =  $(2n-4)90^\circ$  where  $n$  is the number of sides

Example 27



$$\begin{aligned} \text{angle sum} &= (n-2)180^\circ \\ &= (6-2)\times 180^\circ \\ &= 4\times 180^\circ \\ &= 720^\circ \end{aligned}$$

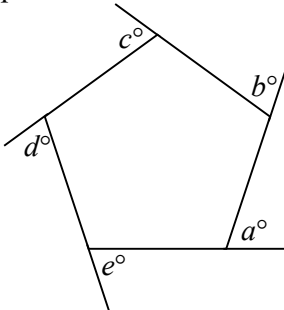
Example 28



$$\begin{aligned} \text{angle sum} &= (n-2)180^\circ \\ &= (8-2)\times 180^\circ \\ &= 6\times 180^\circ \\ &= 1080^\circ \end{aligned}$$

**Exterior angle sum of a polygon is  $360^\circ$**

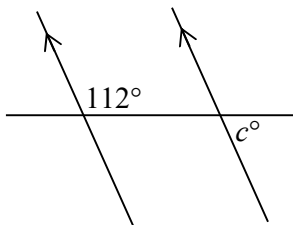
Example 29



$$a + b + c + d + e = 360^\circ \text{ (Exterior angle sum of a pentagon)}$$

**Further examples**

Example 30



$$c = 68^\circ \text{ (Corresponding angles in parallel lines then straight angle)}$$

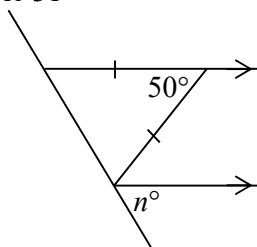
OR

$$c = 68^\circ \text{ (Alternate angles in parallel lines then straight angle)}$$

OR

$$c = 68^\circ \text{ (Co-interior angles in parallel lines then vertically opposite angle)}$$

Example 31

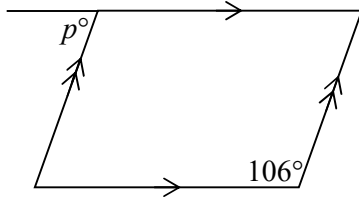


$$n = 65^\circ \text{ (Angle sum of an isosceles triangle then corresponding angles in parallel lines)}$$

There are other steps/methods for solving this.

## WorkBook

Example 32



$p = 74^\circ$  (Opposite angles in parallelogram then straight angle)

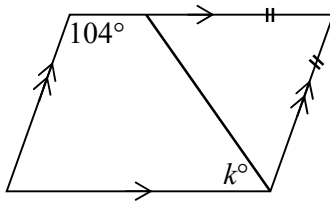
OR

$p = 74^\circ$  (Co-interior angles in parallel lines then alternate angles in parallel lines)

OR

$p = 74^\circ$  (Co-interior angles in parallel lines then corresponding angles in parallel lines)

Example 33



$k = 52^\circ$  (Cointerior angles, angle sum of an isosceles triangle and opposite angles in a parallelogram)

