WorkBook

GEOMETRY

Deduction

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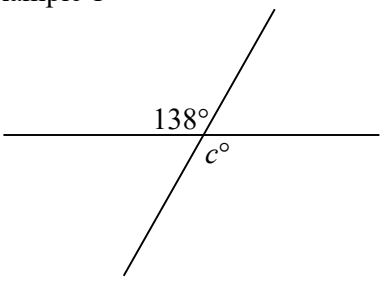
WorkBook

DEDUCTIVE GEOMETRY

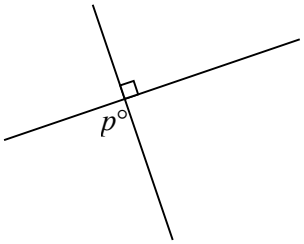
Vertically opposite angles are equal.

Example 1



$c = 138°$ (Vertically opposite angles)

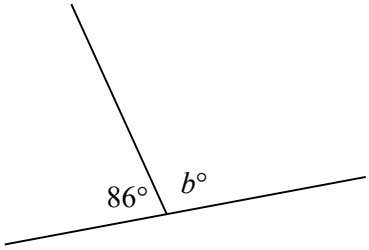
Example 2



$p = 90°$ (Vertically opposite angles)

Straight angles are supplementary. That is, they add to 180°

Example 3

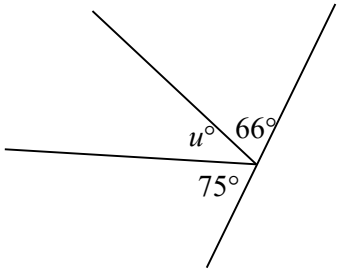


$b = 94°$ (Straight angle)

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

$b = 94$

Example 4



$u = 39°$ (Straight angle)

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

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

$u = 39$

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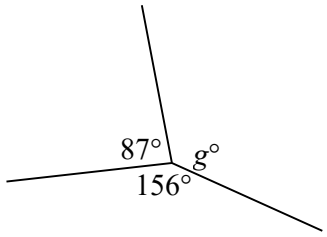
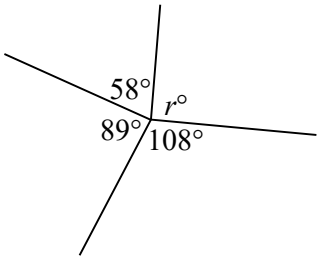
Angle of revolution adds to 360°

Example 5



$g = 117°$ (Angle of revolution)

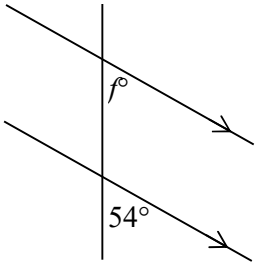
Example 6



$r = 105°$ (Angle of revolution)

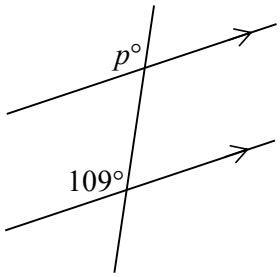
Corresponding angles in parallel lines are equal.

Example 7



$f = 54°$ (Corresponding angles in parallel lines)

Example 8



$p = 109°$ (Corresponding angles in parallel lines)

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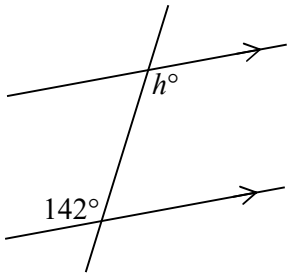
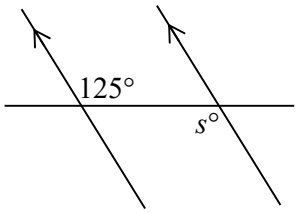
Alternate angles in parallel lines are equal.

Example 9



$h = 142°$ (Alternate angles in parallel lines)

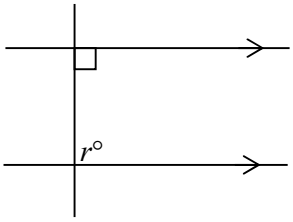
Example 10



$s = 125°$ (Alternate angles in parallel lines)

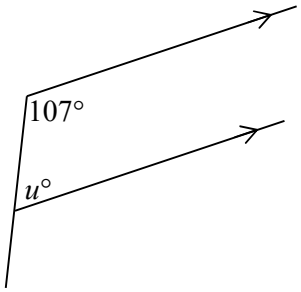
Cointerior angles in parallel lines are equal.

Example 11



$r = 90°$ (Cointerior angles in parallel lines)

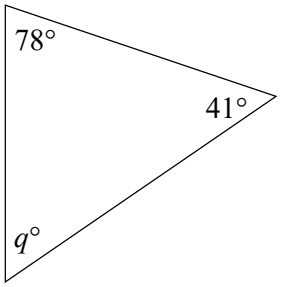
Example 12



$u = 107°$ (Cointerior angles in parallel lines)

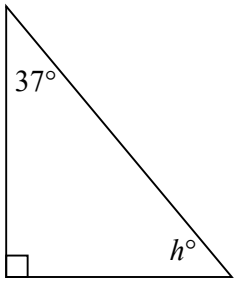
Angle sum of a triangle is 180°.

Example 13



$q = 61°$ (Angle sum of a triangle)

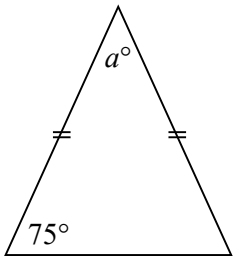
Example 14



$h = 53°$ (Angle sum of a triangle)

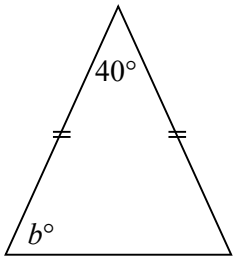
The exterior angle of a triangle is equal to the sum of the remote interior angles.

Example 15



$a = 30°$ (Angle sum of an isosceles triangle)

Example 16

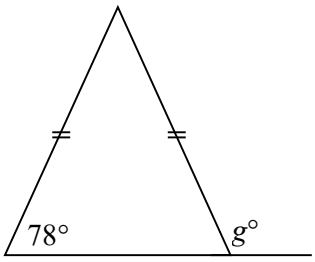


$r = 70°$ (Angle sum of an isosceles triangle)

WorkBook

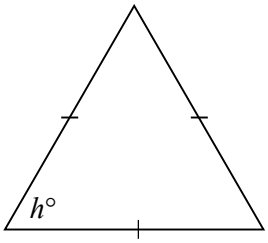
Isosceles and equilateral triangle

Example 17



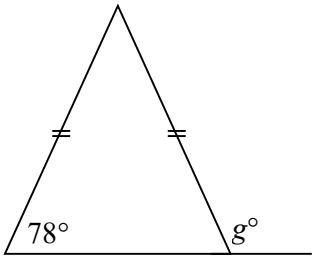
$a = 100°$ (Exterior angle of a triangle)

Example 18



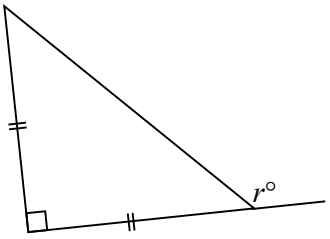
$r = 60°$ (Angle of an equilateral triangle)

Example 19



$a = 102°$ (Equal angles in an isosceles triangle and straight angle)

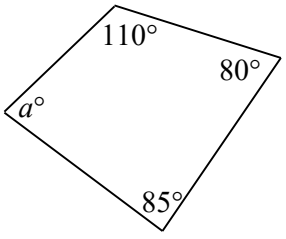
Example 20



$r = 135°$ (Exterior angle of an isosceles right-angled triangle)

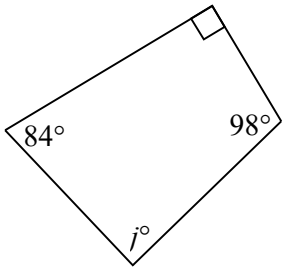
Angle sum of a quadrilateral is 360°

Example 21



$a = 85°$ (Angle sum of a quadrilateral)

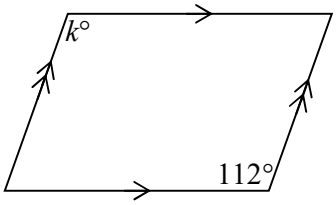
Example 22



$r = 88°$ (Angle sum of a quadrilateral)

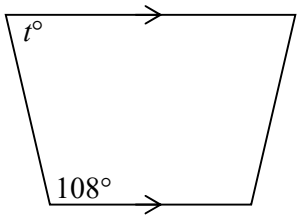
Other properties of quadrilaterals

Example 23



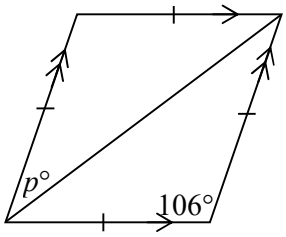
$a = 112°$ (Opposite angles in a parallelogram)

Example 24



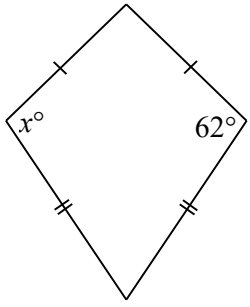
$r = 72°$ (co-interior angles in parallel lines)

Example 25



$p = 37°$ (angles sum and diagonals bisect angles in a rhombus)

Example 26



$x = 62°$ (Opposite equal angles of a kite)

WorkBook

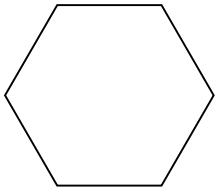
Interior angle sum of a polygon is given by the formula $(n\text{-}2)180°$

Angle sum = $(n\text{-}2)180°$ where n is the number of sides

OR

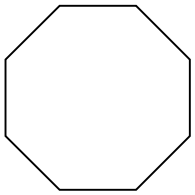
Angle sum = $(2n\text{-}4)90°$ where n is the number of sides

Example 27



angle sum $= (n\text{-}2)180°$
$= (6\text{-}2)\times 180°$
$= 4\times 180°$
$= 720°$

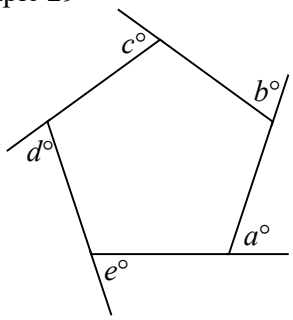
Example 28



angle sum $= (n\text{-}2)180°$
$= (8\text{-}2)\times 180°$
$= 6\times 180°$
$= 1080°$

Exterior angle sum of a polygon is 360°

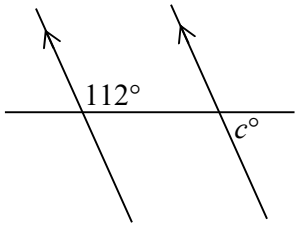
Example 29



$a + b + c + d + e = 360°$ (Exterior angle sum of a pentagon)

Further examples

Example 30



$c = 68°$ (Corresponding angles in parallel lines then straight angle)

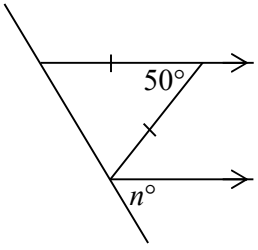
OR

$c = 68°$ (Alternate angles in parallel lines then straight angle)

OR

$c = 68°$ (Co-interior angles in parallel lines then vertically opposite angle)

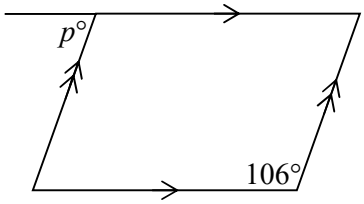
Example 31



$n = 65°$ (Angle sum of an isosceles triangle then corresponding angles in parallel lines)

There are other steps/methods for solving this.

Example 32



p = 74° (Opposite angles in parallelogram then straight angle)

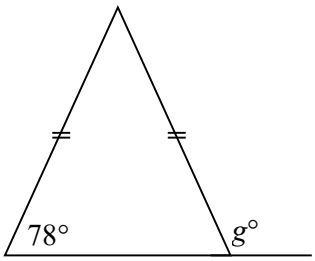
OR

p = 74° (Co-interior angles in parallel lines then alternate angles in parallel lines)

OR

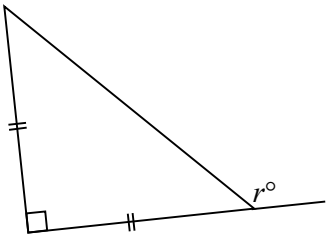
p = 74° (Co-interior angles in parallel lines then corresponding angles in parallel lines)

Example 33



a = 102° (Equal angles in an isosceles triangle and straight angle)

Example 34



r = 135° (Exterior angle of an isosceles right-angled triangle)