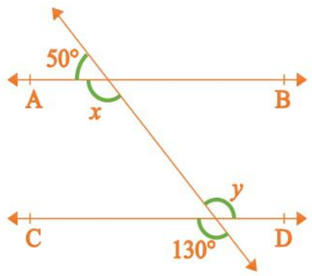
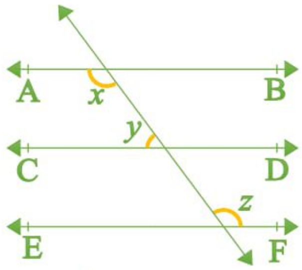
Exercise 6.2

Question 1:
In Figure, find the values of x and y and then show that AB || CD.

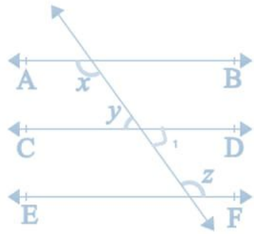


Answer 1:
$50° + x = 180°$ [∵ Linear Pair]
$\Rightarrow x = 180° - 50° = 130°$ and
$y = 130°$ [∵ Vertically Opposite Angles]
Hence, $x = y = 130°$
Since, alternate angles are equal. Hence, AB || CD.

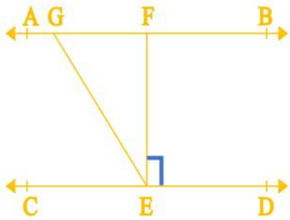
Question 2:
In Figure, if AB || CD, CD || EF and $y : z = 3 : 7$, find x.



Answer 2:
Given: $y : z = 3 : 7$
Let, $y = 3k$, therefore $z = 7k$
$y = \angle 1 = 3k$ [∵ Vertically Opposite Angles]
Given: CD || EF,
Therefore,
$\angle 1 + z = 180°$ [∵ Sum of co-interior angles]
$\Rightarrow 3k + 7k = 180°$
$\Rightarrow 10k = 180°$
$\Rightarrow k = \frac{180°}{10} = 18°$
Hence, $z = 7k = 7 \times 18° = 126°$
Given that: AB || CD and CD || EF, therefore AB || EF
$\Rightarrow x = z = 126°$ [∵ Alternate Angles]

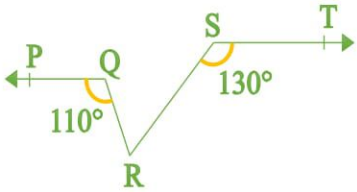


Question 3:
In Figure, if AB || CD, EF ⊥ CD and ∠GED = 126°, find ∠AGE, ∠GEF and ∠FGE.



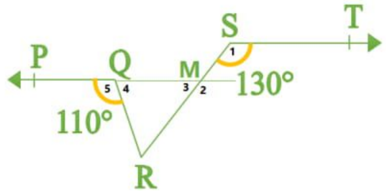
Answer 3:
Given that: AB || CD,
Therefore,
$\angle AGE = \angle GED$ [∵ Alternate Angles]
$\Rightarrow \angle AGE = 126°$
From the figure,
$\angle GED = \angle GEF + \angle FED$
$\Rightarrow 126° = \angle GEF + 90°$
$\Rightarrow \angle GEF = 126° - 90° = 36°$
Given that: AB || CD,
Therefore,
$\angle FGE + 126° = 180°$ [∵ Sum of co-interior angles]
$\Rightarrow \angle FGE = 180° - 126° = 54°$

Question 4:
In Figure, if PQ || ST, ∠PQR = 110° and ∠RST = 130°, find ∠QRS.
[**Hint:** Draw a line parallel to ST through point R.]



Answer 4:

Construction: Produce PQ, so that it intersect ST at M.



Given that: PQ || ST, therefore

$\angle 1 = \angle 2$ [∵ Corresponding Angles]

$\Rightarrow \angle 2 = 130°$

$\angle 2 + \angle 3 = 180°$ [∵ Linear Pair]

$\Rightarrow 130° + \angle 3 = 180°$

$\Rightarrow \angle 3 = 180° - 130° = 50°$

$\angle 5 + \angle 4 = 180°$ [∵ Linear Pair]

$\Rightarrow 110° + \angle 4 = 180°$

$\Rightarrow \angle 4 = 180° - 110° = 70°$

In triangle QMR,

$\angle 3 + \angle 4 + \angle R = 180°$

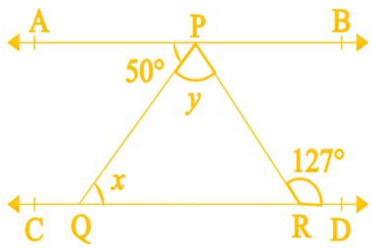
$\Rightarrow 50° + 70° + \angle R = 180°$

$\Rightarrow 120° + \angle R = 180°$

$\Rightarrow \angle R = 180° - 120° = 60°$

Question 5:

In Figure, if AB || CD, ∠APQ = 50° and ∠PRD = 127°, find *x* and *y*.



Answer 5:

Given that: PQ || ST,

Therefore,

$\angle PQR = \angle APQ$ [∵ Alternate Angles]

$\Rightarrow x = 50°$

$\angle APR = \angle PRD$ [∵ Alternate Angles]

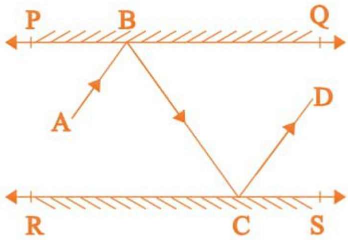
$\Rightarrow \angle APQ + \angle QPR = 127°$

$\Rightarrow 50° + y = 127°$

$\Rightarrow y = 127° - 50° = 77°$

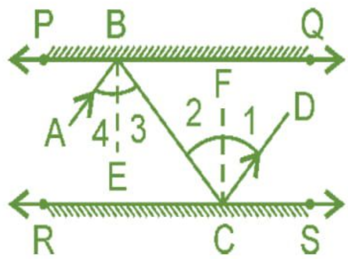
Question 6:

In Figure, PQ and RS are two mirrors placed parallel to each other. An incident ray AB strikes the mirror PQ at B, the reflected ray moves along the path BC and strikes the mirror RS at C and again reflects back along CD. Prove that AB || CD.



Answer 6:

Draw BE ⊥ PQ and CF ⊥ RS.



$\angle 1 = \angle 2$ ... (i) [∵ Angle of incident = Angle of reflection]

Similarly,

$\angle 3 = \angle 4$ ... (ii)

and,

$\angle 2 = \angle 3$ ... (iii) [∵ Alternate Angles]

$\Rightarrow \angle 1 = \angle 4$ [From the equations (i), (ii) and (iii)]

$\Rightarrow 2\angle 1 = 2\angle 4$

$\Rightarrow \angle 1 + \angle 1 = \angle 4 + \angle 4$

$\Rightarrow \angle 1 + \angle 2 = \angle 3 + \angle 4$ [From the equation (i) and (ii)]

$\Rightarrow \angle BCD = \angle ABC$

Since, the alternate angles are equal. Hence, AB || CD.