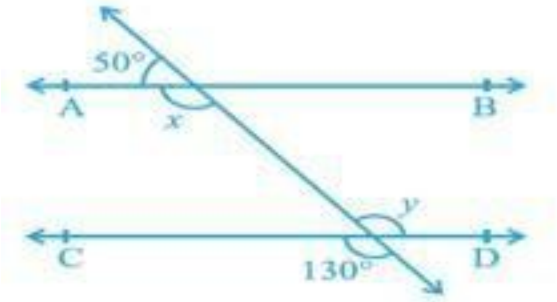
Exercise-6.2

1. In the given figure, find the values of x and y and then show that AB | | CD.



Ans.

We need to find the value of x and y in the figure given below and then prove that $AB \parallel CD$.

From the figure, we can conclude that

$y = 130^\circ$ (Vertically opposite angles), and

x and 50° form a pair of linear pair.

We know that the sum of linear pair of angles is 180°.

$x + 50^\circ = 180^\circ$

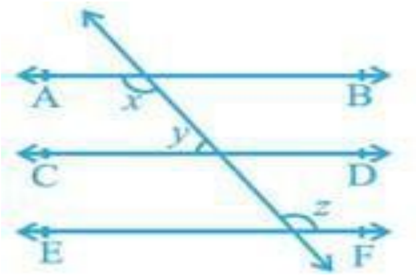
$x = 130^\circ$.

$x = y = 130^\circ$.

From the figure, we can conclude that x and y form a pair of alternate interior angles corresponding to the lines *AB* and *CD*.

Therefore, we can conclude that $x = 130^\circ$, $y = 130^\circ$ and $AB \parallel CD$.

2. In the given figure, if AB | | CD, CD | | EF and y : z = 3: 7, find x.



Ans. We are given that $AB \parallel CD$, $CD \parallel EF$ and $y : z = 3 : 7$.

We need to find the value of x in the figure given below.

We know that lines parallel to the same line are also parallel to each other.

We can conclude that $AB \parallel CD \parallel EF$.

Let Angles be $y = 3a$ and $z = 7a$.

We know that angles on same side of a transversal are supplementary.

$\therefore\ x + y = 180^\circ$.

$x = z$ (Alternate interior angles)

$z + y = 180^\circ$, or

$7a + 3a = 180^\circ$

$\Rightarrow\ 10a = 180^\circ$

$a = 18^\circ$.

$z = 7a = 126^\circ$

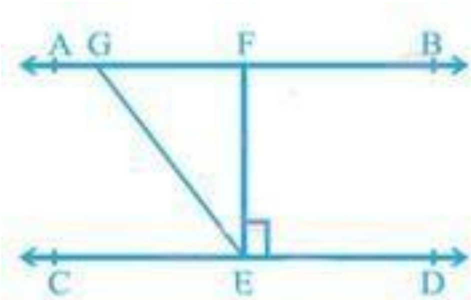
$y = 3a = 54^\circ$.

Now $x + 54^\circ = 180^\circ$

$x = 126^\circ$.

Therefore, we can conclude that $x = 126^\circ$.

3. In the given figure, If AB || CD, $EF \perp CD$ and $\angle GED = 126^\circ$, find $\angle AGE, \angle GEF$ and $\angle FGE$.



Ans. We are given that $AB \parallel CD$, $EF \perp CD$ and $\angle GED = 126^\circ$.

We need to find the value of $\angle AGE, \angle GEF$ and $\angle FGE$ in the figure given below.

$\angle GED = 126^\circ$

$\angle GED = \angle FED + \angle GEF$.

But, $\angle FED = 90^\circ$.

$126^\circ = 90^\circ + \angle GEF$

$\Rightarrow \angle GEF = 36^\circ$.

$\because \angle AGE = \angle GED$ (Alternate angles)

$\therefore \angle AGE = 126^\circ$.

From the given figure, we can conclude that $\angle FED$ and $\angle FEC$ form a linear pair.

We know that sum of the angles of a linear pair is 180°.

$\angle FED + \angle FEC = 180^\circ$

$\Rightarrow 90^\circ + \angle FEC = 180^\circ$

$\Rightarrow \angle FEC = 90^\circ$

$\angle FEC = \angle GEF + \angle GEC$

$\therefore 90^\circ = 36^\circ + \angle GEC$

$\Rightarrow \angle GEC = 54^\circ$.

$\angle GEC = \angle FGE = 54^\circ$ (Alternate interior angles)

Therefore, we can conclude that $\angle AGE = 126^\circ$, $\angle GEF = 36^\circ$ and $\angle FGE = 54^\circ$.

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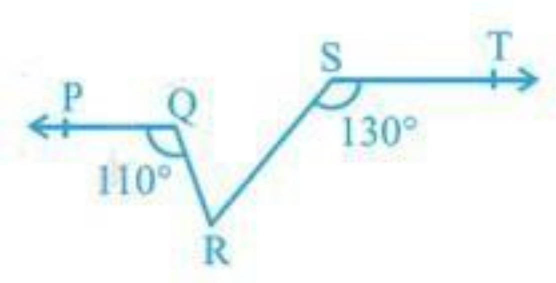
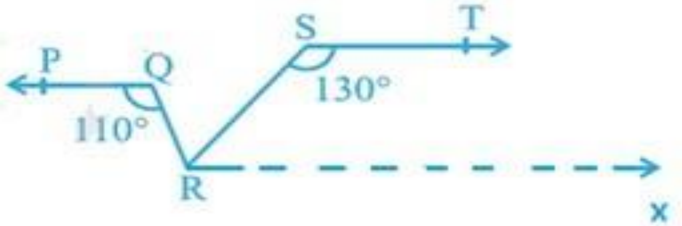
4. In the given figure, if PQ || ST, $\angle PQR = 110^\circ$ and $\angle RST = 130^\circ$, find $\angle QRS$.

[Hint: Draw a line parallel to ST through point R.]



Ans. We are given that $PQ \parallel ST$, $\angle PQR = 110^\circ$ and $\angle RST = 130^\circ$.

We need to find the value of $\angle QRS$ in the figure.



We need to draw a line *RX* that is parallel to the line *ST*, to get

Thus, we have $ST \parallel RX$. We know that lines parallel to the same line are also parallel to each other. We can conclude that $PQ \parallel ST \parallel RX$.

$\angle PQR = \angle QRX$ (Alternate interior angles)

S0 $\angle QRX = 110^\circ$.

We know that angles on same side of a transversal are supplementary.

$\angle RST + \angle SRX = 180^\circ \Rightarrow 130^\circ + \angle SRX = 180^\circ$

$\Rightarrow \angle SRX = 180^\circ - 130^\circ = 50^\circ$.

From the figure, we can conclude that

$\angle QRX = \angle SRX + \angle QRS \Rightarrow 110^\circ = 50^\circ + \angle QRS$

$\Rightarrow \angle QRS = 60^\circ$.

Therefore, we can conclude that $\angle QRS = 60^\circ$.

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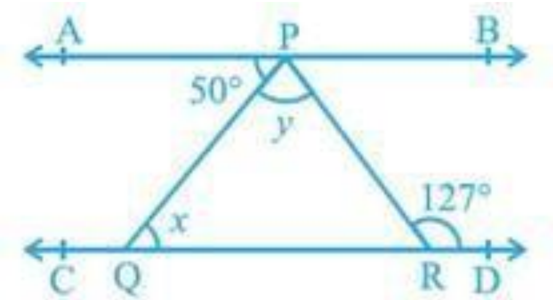
5. In the given figure, if AB || CD, $\angle APQ = 50^\circ$ and $\angle PRD = 127^\circ$, find x and y.



Ans. We are given that $AB \parallel CD$, $\angle APQ = 50^\circ$ and $\angle PRD = 127^\circ$.

We need to find the value of x and y in the figure.

$\angle APQ = x = 50^\circ$. (Alternate interior angles)

$\angle PRD = \angle APR = 127^\circ$. (Alternate interior angles)

$\angle APR = \angle QPR + \angle APQ$.

$127^\circ = y + 50^\circ \quad \Rightarrow y = 77^\circ$.

Therefore, we can conclude that $x = 50^\circ$ and $y = 77^\circ$.

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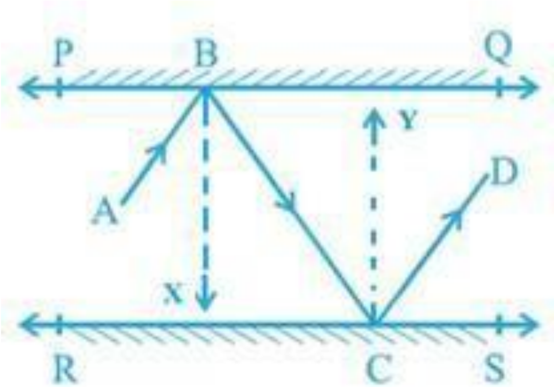
6. In the given figure, PQ and RS are two mirrors placed parallel to each other. An incident ray AB strikes the mirror PQ at B, the reflected ray moves along the path BC and strikes the mirror RS at C and again reflects back along CD. Prove that AB || CD.

Ans. We are given that PQ and RS are two mirrors that are parallel to each other.



We need to prove that $AB \parallel CD$ in the figure.

Let us draw lines BX and CY that are parallel to each other, to get $AB \parallel CD$

We know that according to the laws of reflection

$\angle ABX = \angle CBX$ and $\angle BCY = \angle DCY$.

$\angle BCY = \angle CBX$ (Alternate interior angles)

We can conclude that $\angle ABX = \angle CBX = \angle BCY = \angle DCY$.

From the figure, we can conclude that

$\angle ABC = \angle ABX + \angle CBX$, and $\angle DCB = \angle BCY + \angle DCY$.

Therefore, we can conclude that $\angle ABC = \angle DCB$.

From the figure, we can conclude that $\angle ABC$ and $\angle DCB$ form a pair of alternate interior angles corresponding to the lines AB and CD, and transversal BC.

Therefore, we can conclude that $AB \parallel CD$.