Grade 7
Lines and Angles

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Choose correct answer(s) from the given choices

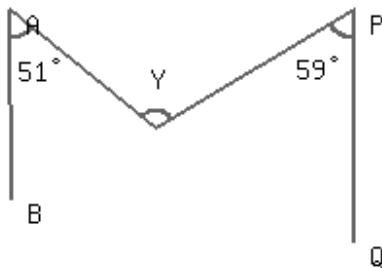**(1)** Which of the following pairs of angles is complementary?

a. 56° and 34°

b. 31° and 149°

c. 42° and 239°

d. 39° and 329°

(2) What is the term used to denote the angles given below?
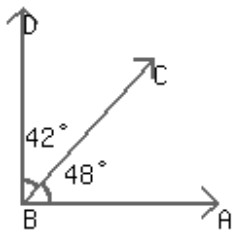
a. Supplementary Angles

b. Reflex Angles

c. Complementary Angles

d. Right Angles

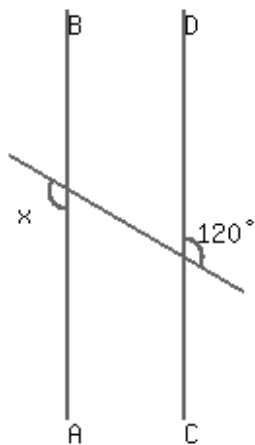**(3)** If AB and PQ are parallel, compute the measure of angle Y.
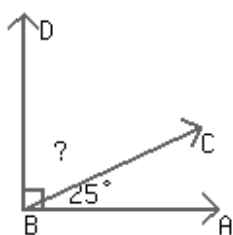

a. 70°

b. 110°

c. 75°

d. 105°

Answer the questions

(4) If the difference between the measure of an angle and its complement is 28°, find the measure of the angle.

(5) The sum of an angle and 10 times its complement is 450°. Find the measure of the angle.

(6) If AB and CD are parallel, find the value of ∠x.

(7) Compute the measure of ∠CBD given below.

(8) What is the complement of 59°?

(9) If an angle is 26° greater than its supplement, find the measure of the angle.

(10) If AB and PQ are parallel, compute the measure of ∠W.

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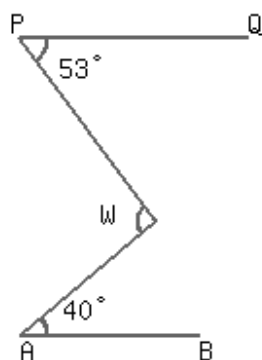
(1) **a.** 56° and 34°

Step 1

Remember: Two angles are said to be complementary, if the sum of their measures is equal to 90°.

Step 2

Let us add the measure of angles in each pair.

56° + 34° = 90°

31° + 149° = 180°

42° + 239° = 270°

39° + 329° = 360°

Step 3

Hence, **56° and 34°** are complementary angles.

(2) **c.** Complementary Angles

Step 1

In the given figure, ∠DBC = 42° and ∠ABC = 48°. The sum of these two angles is 42° + 48° = 90°.

Step 2

We know that a pair of angles whose sum is 90° is called as complementary angles.

Step 3

Therefore, the term used to denote the given type of angles is **complementary angles**.

(3) **b.** 110°

Step 1
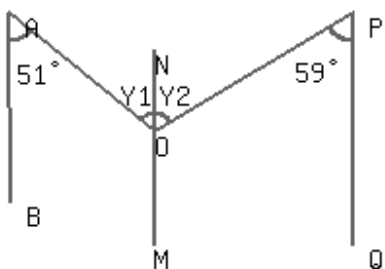
Draw a line MN that is parallel to lines PQ and AB.

We know, $\angle Y = \angle Y1 + \angle Y2$

Step 2

Now, AB and NM are two parallel lines cut by a transversal OA.

Hence, $\angle NOA = \angle OAB$ (Alternate angles)

$\Rightarrow \angle Y2 = 51°$

Step 3

Now, PQ and NM are two parallel lines cut by a transversal OP.

Hence, $\angle NOP = \angle OPQ$ (Alternate angles)

$\Rightarrow \angle Y1 = 59°$

Step 4

We know, $\angle Y = \angle Y1 + \angle Y2$

$= 59° + 51°$

$= 110°$

Hence, $\angle Y = \mathbf{110°}$.

(4) 59°

Step 1

We know that the sum of complementary angles is 90°.

Step 2

Let the angle be x. So, its complement = 90° - x.

Step 3

According to the question, the difference between the angle and its complement is 28°.

Therefore, x - (90° - x) = 28°

⇒ x - 90° + x = 28°

⇒ 2x = 28° + 90°

⇒ 2x = 118°

⇒ x = $\dfrac{118}{2}$ °

⇒ x = 59°

Step 4

Hence, the value of the angle is **59°**.

(5) 50°

Step 1

We know that the sum of an angle and its complement is 90°.

Step 2

Let us assume the angle to be x. Therefore, its complement = 90° - x

So, 10 times the complement of x = 10 (90° - x)

Step 3

According to the question, the sum of the angle and 10 times its complement is 450°.

Therefore, x + 10(90° - x) = 450°

⇒ x + 900° - 10x = 450°

⇒ 900° - 9x = 450°

⇒ 900° - 450° = 9x

⇒ 450° = 9x
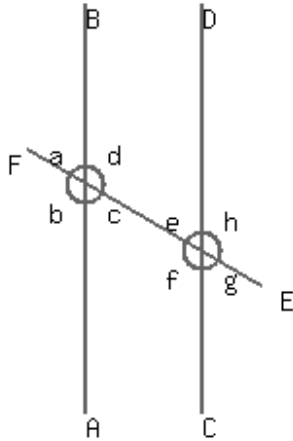
⇒ 9x = 450°

⇒ x = $\dfrac{450}{9}$ °

⇒ x = 50°

Step 4

Hence, the value of that angle is **50°**.

(6)   120°

Step 1

It is given that lines AB and CD are parallel and the third line (say EF) cuts the lines AB and CD at a certain angle as shown in the figure above.
Let us redraw the figure as below:

∠a = ∠c (Vertically opposite angles)
∠c = ∠e (Alternate interior angles)

Therefore, we can write,
∠a = ∠c = ∠e = ∠g

Again,
∠b = ∠d (Vertically opposite angles)
∠d = ∠f (Alternate interior angles)

Therefore, we can write,
∠b = ∠d = ∠f = ∠h

We know that sum of two adjacent angles is equal to 180°.
Therefore, we can write,
∠a + ∠b = 180°,
∠b + ∠c = 180°,
∠c + ∠d = 180°,
∠d + ∠a = 180°

Step 2

Here, ∠h = 120° and ∠b = x
As ∠b is equal to ∠h, x is 120°.

Step 3

Hence, the value of x is **120°**.

(7) 65°

> **Step 1**
>
> Since the angle formed by the rays BD and AB is a right angle, its value is equal to 90°.
>
> **Step 2**
>
> The angle between the rays BC and BA is given to be 25°, and we have to find the angle between the rays BD and BC, which will be equal to the difference between 90° and 25°.
>
> **Step 3**
>
> So, $\angle$ CBD = 90° - 25° = **65°**.

(8) 31

> **Step 1**
>
> The two angles are said to be complementary if the sum of their measure is 90°.
>
> **Step 2**
>
> Therefore, the complement of 59° = (90° - 59°) = 31°
>
> **Step 3**
>
> Hence, the complement of 59° is **31°**.

(9) 103°

> **Step 1**
>
> We know that the sum of the supplementary angles is 180°.
>
> **Step 2**
>
> According to the question, the angle is 26° greater than its supplement.
>
> **Step 3**
>
> Let the angle be x. Its supplement = 180° - x.
>
> **Step 4**
>
> Therefore, x = 26° + (180° - x)
>
> $\Rightarrow$ x + x = 26° + 180°
>
> $\Rightarrow$ 2x = 26° + 180°
>
> $\Rightarrow$ 2x = 206°
>
> $\Rightarrow$ x = $\dfrac{206}{2}$ °
>
> $\Rightarrow$ x = 103°
>
> **Step 5**
>
> Hence, the value of the angle is **103°**.

(10) 93°

Step 1
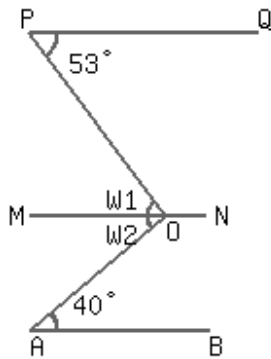
Draw a line MN parallel to both lines PQ and AB.

According to the figure,

$\angle$ W1 + $\angle$ W2 + $\angle$ W = 360°

$\Rightarrow \angle$ W = 360° - $\angle$ W1 - $\angle$ W2

Step 2

Now, AB and MN are two parallel lines cut by a transversal OA.

Hence, $\angle$ MOA = $\angle$ OAB (Alternate angles)

$\Rightarrow \angle$ W2 = 40°

Step 3

Now, PQ and MN are two parallel lines cut by a transversal OP.

Hence, $\angle$ MOP = $\angle$ OPQ (Alternate angles)

$\Rightarrow \angle$ W1 = 53°

Step 4

We know, $\angle$ W = $\angle$ W1 + $\angle$ W2

= 53° + 40°

= **93°**

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