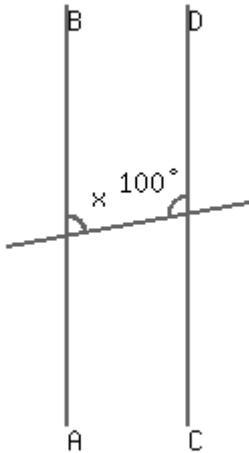


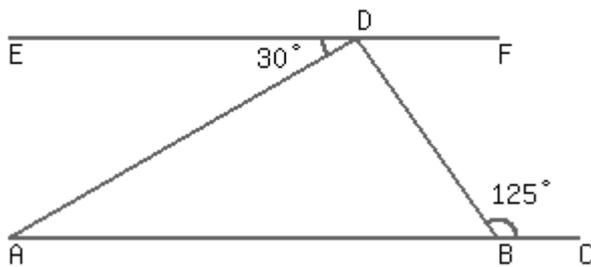
Choose correct answer(s) from the given choices

- (1) If AB and CD are parallel, find the value of $\angle x$.



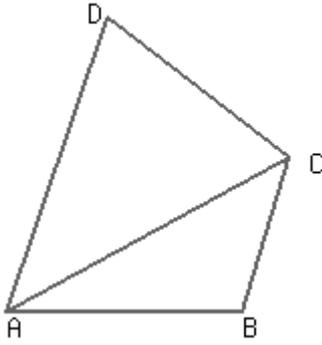
- | | |
|----------------|---------------|
| a. 100° | b. 70° |
| c. 80° | d. 90° |

- (2) If AC and EF are parallel, find $\angle ADB$.



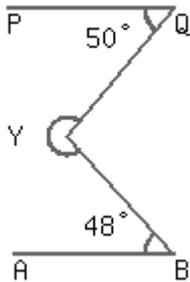
- | | |
|---------------|----------------|
| a. 95° | b. 105° |
| c. 85° | d. 115° |

(7) The number of angles formed in the given figure are .



Answer the questions

(8) If AB and PQ are parallel, compute the measure of $\angle Y$.



(9) A ship is sailing in the North direction. If it changes its direction towards the West on moving anticlockwise from its present position then by what angle will it turn?

(10) Find the angle between:

- | | |
|------------------------------|------------------------------|
| A) North-West and South-West | B) South-West and South-East |
| C) West and East | D) North-East and North |



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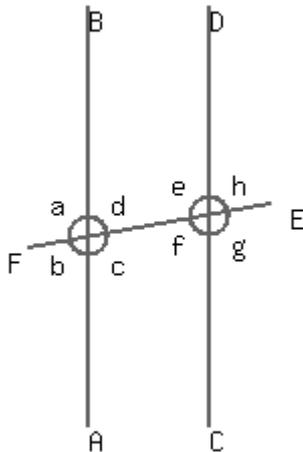
Solutions

(1) c. 80°

Step 1

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

Let us redraw the figure as below:



$$\angle a = \angle c \text{ (Vertically opposite angles)}$$

$$\angle c = \angle e \text{ (Alternate interior angles)}$$

Therefore we can write,

$$\angle a = \angle c = \angle e = \angle g$$

Also,

$$\angle b = \angle d \text{ (Vertically opposite angles)}$$

$$\angle d = \angle f \text{ (Alternate interior angles)}$$

Therefore we can write,

$$\angle b = \angle d = \angle f = \angle h$$

We know that the sum of two adjacent angles is equal to 180° .

Therefore, we can write,

$$\angle a + \angle b = 180^\circ,$$

$$\angle b + \angle c = 180^\circ,$$

$$\angle c + \angle d = 180^\circ,$$

$$\angle d + \angle a = 180^\circ$$

Step 2

Here, $\angle e = 100^\circ$ and $\angle d = x$

$$\angle e + \angle h = 180^\circ$$

$$\Rightarrow 100^\circ + \angle h = 180^\circ$$

$$\Rightarrow \angle h = 180^\circ - 100^\circ$$

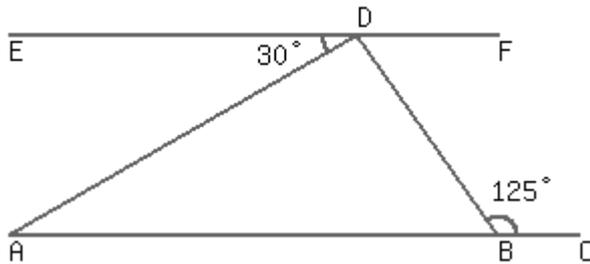
$$\Rightarrow \angle h = 80^\circ$$

As $\angle h$ is equal to $\angle d$, x is 80° .

Step 3

Hence, the value of x is 80° .

(2) a. 95°

Step 1

If we look at the figure carefully, we notice that $\angle ADE = 30^\circ$ and $\angle DBC = 125^\circ$.

Step 2

According to the question, AC and EF are parallel.

Therefore, we can say that $\angle EDB$ and $\angle DBC$ are alternate interior angles.

Step 3

Now, $\angle EDB = \angle DBC$ (Alternate interior angles)

$$\Rightarrow \angle ADE + \angle ADB = \angle DBC \text{ (As, } \angle EDB = \angle ADE + \angle ADB)$$

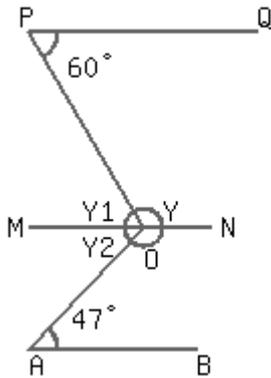
$$\Rightarrow \angle ADB = 125^\circ - \angle ADE \text{ (As, } \angle ADB = 125^\circ)$$

$$\Rightarrow \angle ADB = 125^\circ - 30^\circ \text{ (As, } \angle ADE = 30^\circ)$$

$$\Rightarrow \angle ADB = 95^\circ$$

Step 4

Therefore, $\angle ADB = 95^\circ$.

(3) c. 253° **Step 1**

Draw a line MN parallel to both the line PQ and AB.

According to the figure,

$$\angle Y = \angle Y1 + \angle Y2$$

Step 2

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

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

$$\Rightarrow \angle Y2 = 47^\circ$$

Step 3

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

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

$$\Rightarrow \angle Y1 = 60^\circ$$

Step 4

We know, $\angle Y = 360^\circ - \angle Y1 - \angle Y2$

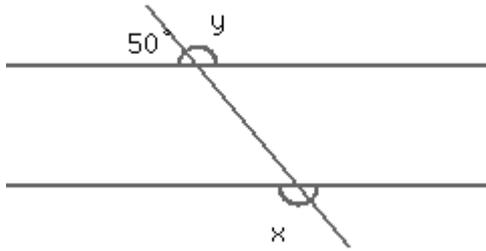
$$= 360^\circ - 60^\circ - 47^\circ$$

$$= 360^\circ - 107^\circ$$

$$= \mathbf{253^\circ}$$

(4) b. 130°

Step 1



We know that the angle made by a straight line is 180° .

Therefore, we can write,

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

$$\text{or } y = 180^\circ - 50^\circ = 130^\circ$$

Step 2

When a straight line cuts any two parallel lines, its alternate angles are equal.

Since, angles x and y are alternate angles.

We get,

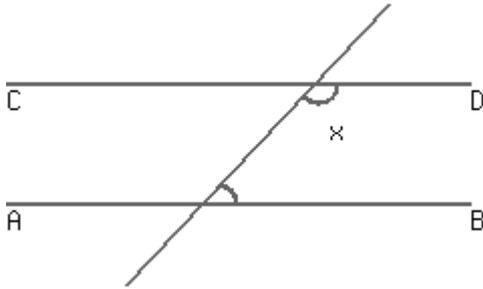
$$\angle x = \angle y = \mathbf{130^\circ}. \text{ (alternate angles of two parallel lines are equal)}$$

(5)

100

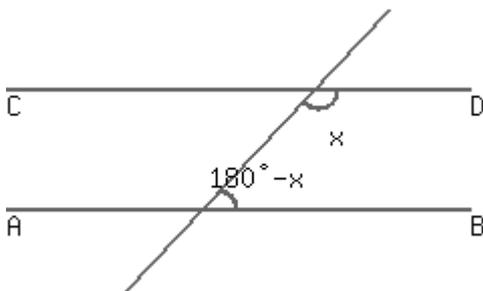
Step 1

Let x be the first interior angle on the same side of a transversal intersecting two parallel lines.

**Step 2**

We know that the sum of two interior angles on the same side of a transversal intersecting two parallel lines is 180° .

Thus, the second interior angle on the same side of a transversal intersecting two parallel lines = $180^\circ - x$



The ratio of the two interior angles on the same side of a transversal intersecting two parallel

$$\text{lines} = \frac{x}{180^\circ - x}$$

Step 3

It is given that the ratio of the two interior angles on the same side of a transversal intersecting two parallel lines = 4:5

$$\text{Therefore, } \frac{x}{180^\circ - x} = \frac{4}{5}$$

By cross multiplying, we get:

$$5x = 4(180^\circ - x)$$

$$\Rightarrow 5x = 4 \times 180^\circ - 4x$$

$$\Rightarrow 5x + 4x = 720^\circ$$

$$\Rightarrow 9x = 720^\circ$$

$$\Rightarrow x = \frac{720}{9}^\circ$$

$$\Rightarrow x = 80^\circ$$

Step 4

The first angle = 80°

The second angle = $180^\circ - 80^\circ = 100^\circ$

Step 5

Hence, the greater of the two angles is **100°**.

(6) 60**Step 1**

According to the question, $\angle DOC = 30^\circ$ and OD is perpendicular to AB.
Therefore, $\angle AOD = 90^\circ$ and $\angle BOD = 90^\circ$.

Step 2

Also, $\angle DOC + \angle AOC = \angle AOD$
 $\Rightarrow 30^\circ + \angle AOC = 90^\circ$ (As, $\angle AOD = 90^\circ$ and $\angle DOC = 30^\circ$)
 $\Rightarrow \angle AOC = 90^\circ - 30^\circ$
 $\Rightarrow \angle AOC = 60^\circ$

Step 3

Now, $\angle BOC - \angle AOC = \angle BOD + \angle DOC - \angle AOC$ (As, $\angle BOC = \angle BOD + \angle DOC$)
 $= 90^\circ + 30^\circ - 60^\circ$ (As, $\angle BOD = 90^\circ$, $\angle DOC = 30^\circ$ and $\angle AOC = 60^\circ$)
 $= 60^\circ$

Step 4

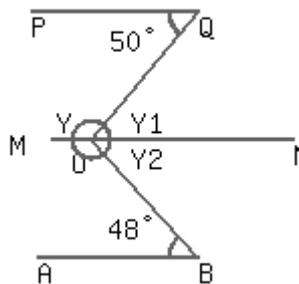
Therefore, $\angle BOC - \angle AOC = 60^\circ$

(7) 8**Step 1**

An angle is the space between any two intersecting lines.

Step 2

If we look at the figure carefully, we notice that the 8 angles formed are as follows :
 $\angle ABC$, $\angle BAC$, $\angle ACB$, $\angle ACD$, $\angle ADC$, $\angle CAD$, $\angle DAB$, $\angle DCB$.

(8) 262° **Step 1**

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

According to the given figure, $\angle Y1 + \angle Y2 + \angle Y$ makes a full angle, i.e., 360° .

Therefore, $\angle Y1 + \angle Y2 + \angle Y = 360^\circ$

$$\Rightarrow \angle Y = 360^\circ - \angle Y1 - \angle Y2$$

Step 2

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

Hence, $\angle NOB = \angle OBA$ (Alternate angles)

$$\Rightarrow \angle Y2 = 48^\circ$$

Step 3

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

Hence, $\angle NOQ = \angle OQP$ (Alternate angles)

$$\Rightarrow \angle Y1 = 50^\circ$$

Step 4

We know, $\angle Y = 360^\circ - \angle Y1 - \angle Y2$

$$= 360^\circ - 50^\circ - 48^\circ$$

$$= 360^\circ - 98^\circ$$

$$= 262^\circ$$

Hence, $\angle Y = 262^\circ$.

(9) 90° **Step 1**

According to the question, the ship is sailing in the North direction.

Step 2

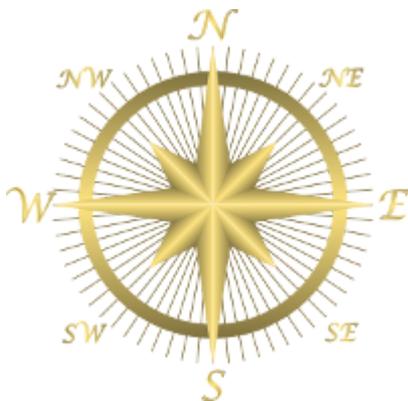
Now, the direction of the ship changes to West.

Step 3

The angle by which the ship has to turn is actually the angle between the North and West directions.

Step 4

Let us look at the directions as shown below:

**Step 5**

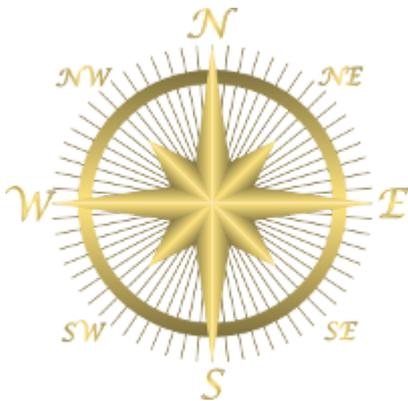
The angle between the North and West is 90° .

Step 6

Thus, the angle by which the ship has to turn is 90° .

(10) A) 90° **Step 1**

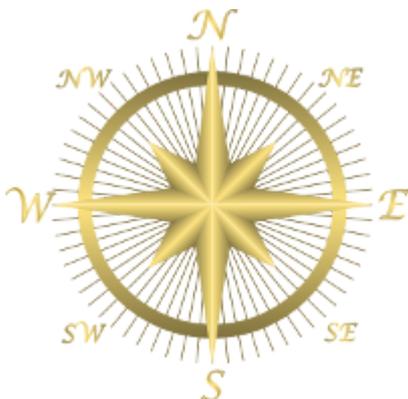
Let us look at the directions shown below:

**Step 2**

We can see that the angle between the North-West and South-West direction is 90° .

B) 90° **Step 1**

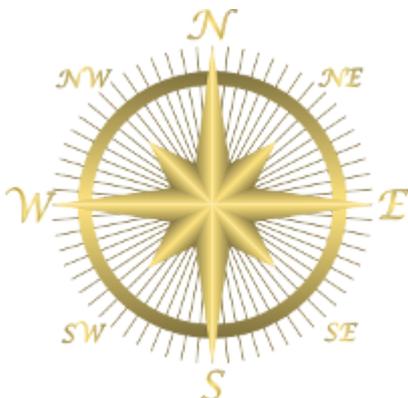
Let us look at the directions shown below:

**Step 2**

We can see that the angle between the South-West and South-East direction is 90° .

C) 180° **Step 1**

Let us look at the directions shown below:

**Step 2**

We can see that the angle between the West and South direction is 90° .

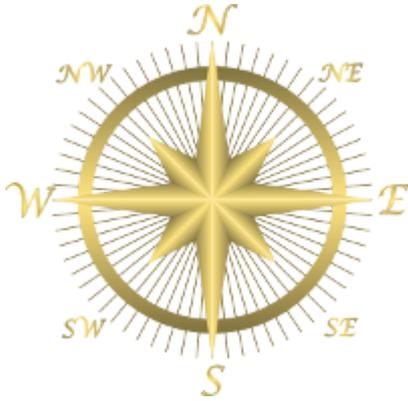
Also, the angle between the South and East direction is 90° .

Step 3

Therefore, the angle between the West and East direction is $90^\circ + 90^\circ = 180^\circ$

D) 45° **Step 1**

Let us look at the directions shown below:

**Step 2**

We can see that the angle between the North-East and North direction is 45° .



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