

EXERCISE 24(B)**1. Write the complement angle of:**

(i) 45°

(ii) x°

(iii) $(x - 10)^\circ$

(iv) $20^\circ + y^\circ$

Solution:(i) The complement angle of 45° is,

$$= 90^\circ - 45^\circ$$

$$= 45^\circ$$

Therefore, the complement angle of 45° is 45°

(ii) x°

The complement angle of x° is,

$$= 90^\circ - x^\circ$$

$$= (90 - x)^\circ$$

Therefore, the complement angle of x° is $(90 - x)^\circ$ **(iii) The complement angle of $(x - 10)^\circ$ is,**

$$= 90^\circ - (x - 10)^\circ$$

$$= 90^\circ - x^\circ + 10^\circ$$

$$= 100^\circ - x^\circ$$

$$= (100 - x)^\circ$$

Therefore, the complement of $(x - 10)^\circ$ is $(100 - x)^\circ$ **(iv) The complement angle of $20^\circ + y^\circ$ is,**

$$= 90^\circ - (20^\circ + y^\circ)$$

$$= 90^\circ - 20^\circ - y^\circ$$

We get,

$$= 70^\circ - y^\circ$$

$$= (70 - y)^\circ$$

2. Write the supplement angle of:

(i) 49°

(ii) 111°

(iii) $(x - 30)^\circ$

(iv) $20^\circ + y^\circ$

Solution:(i) The supplement angle of 49° is,

$$= 180^\circ - 49^\circ$$

$$= 131^\circ$$

Hence, the supplement angle of 49° is 131°

(ii) The supplement angle of 111° is,
 $= 180^\circ - 111^\circ$
 $= 69^\circ$

Hence, the supplement angle of 111° is 69°

(iii) The supplement angle of $(x - 30)^\circ$ is,
 $= 180^\circ - (x - 30)^\circ$
 $= 180^\circ - x^\circ + 30^\circ$
 $= 210^\circ - x^\circ$
 $= (210 - x)^\circ$

Hence, the supplement angle of $(x - 30)^\circ$ is $(210 - x)^\circ$

(iv) The supplement angle of $20^\circ + y^\circ$ is,
 $= 180^\circ - (20^\circ + y^\circ)$
 $= 180^\circ - 20^\circ - y^\circ$
 $= 160^\circ - y^\circ$
 $= (160 - y)^\circ$

Hence, the supplement angle of $20^\circ + y^\circ$ is $(160 - y)^\circ$

3. Write the complement angle of:

- (i) $1/2$ of 60°
(ii) $1/5$ of 160°
(iii) $2/5$ of 70°
(iv) $1/6$ of 90°

Solution:

(i) The complement angle of $(1/2 \text{ of } 60^\circ)$ is,
 $= 90^\circ - (1/2 \times 60^\circ)$

We get,
 $= 90^\circ - 30^\circ$
 $= 60^\circ$

Therefore, the complement angle of $(1/2 \text{ of } 60^\circ)$ is 60°

(ii) The complement angle of $(1/5 \text{ of } 160^\circ)$ is,
 $= 90^\circ - (1/5 \times 160^\circ)$

We get,
 $= 90^\circ - 32^\circ$
 $= 58^\circ$

Therefore, the complement angle of $(1/5 \text{ of } 160^\circ)$ is 58°

(iii) The complement angle of $(2/5 \text{ of } 70^\circ)$ is,
 $= 90^\circ - (2/5 \times 70^\circ)$

We get,
 $= 90^\circ - 28^\circ$

$$= 62^{\circ}$$

Therefore, the complement of $(2 / 5$ of $70^{\circ})$ is 62°

(iv) The complement angle of $(1 / 6$ of $90^{\circ})$ is,

$$= 90^{\circ} - (1 / 6 \times 90^{\circ})$$

We get,

$$= 90^{\circ} - 15^{\circ}$$

$$= 75^{\circ}$$

Therefore, the complement of $(1 / 6$ of $90^{\circ})$ is 75°

4.

(i) 50% of 120°

(ii) $1 / 3$ of 150°

(iii) 60% of 100°

(iv) $3 / 4$ of 160°

Solution:

(i) Supplement angle of 50% of 120° is,

$$= 180^{\circ} - (50\% \text{ of } 120^{\circ})$$

$$= 180^{\circ} - [(120^{\circ} \times 50) / 100]$$

We get,

$$= 180^{\circ} - 60^{\circ}$$

$$= 120^{\circ}$$

Hence, supplement angle of 50% of 120° is 120°

(ii) Supplement angle of $(1 / 3$ of $150^{\circ})$ is,

$$= 180^{\circ} - (1 / 3 \times 150^{\circ})$$

We get,

$$= 180^{\circ} - 50^{\circ}$$

$$= 130^{\circ}$$

Hence, supplement angle of $(1 / 3$ of $150^{\circ})$ is 130°

(iii) Supplement angle of 60% of 100° is,

$$= 180^{\circ} - (60\% \text{ of } 100^{\circ})$$

$$= 180^{\circ} - [(60 \times 100) / 100]$$

We get,

$$= 180^{\circ} - 60^{\circ}$$

$$= 120^{\circ}$$

Hence, the supplement angle of (60% of $100^{\circ})$ is 120°

(iv) Supplement angle of $3 / 4$ of 160°

$$= 180^{\circ} - (3 / 4 \text{ of } 160^{\circ})$$

We get,

$$= 180^{\circ} - 120^{\circ}$$

$$= 60^{\circ}$$

Hence, the supplement angle of $(3 / 4 \text{ of } 160^{\circ})$ is 60°

5. Find the angle:

(i) that is equal to its complement?

(ii) that is equal to its supplement?

Solution:

(i) The angle equal to its complement is 45°

(ii) The angle equal to its supplement is 90°

6. Two complementary angles are in the ratio 7: 8. Find the angles

Solution:

Given

Two complementary angles are in the ratio 7: 8

Let the two complementary angles be $7x$ and $8x$

Hence,

$$7x + 8x = 90^{\circ}$$

$$15x = 90^{\circ}$$

We get,

$$x = 90^{\circ} / 15$$

$$x = 6^{\circ}$$

So, two complementary angles are

$$7x = 7 \times 6^{\circ}$$

$$= 42^{\circ}$$

$$8x = 8 \times 6^{\circ}$$

$$= 48^{\circ}$$

Therefore, two complementary angles are 42° and 48°

7. Two supplementary angles are in the ratio 7: 11. Find the angles

Solution:

Given

Two supplementary angles are in the ratio 7: 11

Let the two supplementary angles be $7x$ and $11x$

Hence,

$$7x + 11x = 180^{\circ}$$

$$18x = 180^{\circ}$$

$$x = 180^{\circ} / 18$$

We get,

$$x = 10^{\circ}$$

So, two supplementary angles are

$$7x = 7 \times 10^0$$

$$= 70^0$$

$$11x = 11 \times 10^0$$

$$= 110^0$$

Therefore, two supplementary angles are 70^0 and 110^0

8. The measures of two complementary angles are $(2x - 7)^0$ and $(x + 4)^0$. Find x.

Solution:

Given

$(2x - 7)^0$ and $(x + 4)^0$ are two complementary angles

We know that,

Sum of two complementary angles = 90^0

Hence,

$$(2x - 7)^0 + (x + 4)^0 = 90^0$$

$$2x - 7 + x + 4 = 90^0$$

$$3x - 3 = 90^0$$

$$3x = 90^0 + 3^0$$

$$3x = 93^0$$

$$x = 93^0 / 3$$

We get,

$$x = 31^0$$

Therefore, the value of $x = 31^0$

9. The measures of two supplementary angles are $(3x + 15)^0$ and $(2x + 5)^0$. Find x.

Solution:

Given

$(3x + 15)^0$ and $(2x + 5)^0$ are two supplementary angles

We know that,

Sum of two supplementary angles = 180^0

Hence,

$$(3x + 15)^0 + (2x + 5)^0 = 180^0$$

$$3x + 15 + 2x + 5 = 180^0$$

$$5x + 20^0 = 180^0$$

$$5x = 180^0 - 20^0$$

$$5x = 160^0$$

$$x = 160^0 / 5$$

We get,

$$x = 32^0$$

Therefore, the value of x is 32°

10. For an angle x° , find:

(i) the complementary angle

(ii) the supplementary angle

(iii) the value of x° if its supplementary angle is three times its complementary angle.

Solution:

For an angle x°

(i) Complementary angle of x° is,

$$= (90^\circ - x)$$

(ii) Supplementary angle of x° is,

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

(iii) As per the statement,

Supplementary angle = 3 (Complementary angle)

$$180^\circ - x = 3(90^\circ - x)$$

$$180^\circ - x = 270^\circ - 3x$$

$$-x + 3x = 270^\circ - 180^\circ$$

$$2x = 90^\circ$$

$$x = 90^\circ / 2$$

We get,

$$x = 45^\circ$$

Therefore, the value of x is 45°