Constructions
Exercise 17C

Q1

Answer :

$\left(c\right)\ 135^\circ$

$\text{Supplement of } 45^\circ = 180^\circ - 45^\circ$
$= 135^\circ$

Q2

Answer :

$\left(b\right)\ 10^\circ$

$\text{Complement of } 80^\circ = 90^\circ - 80^\circ$
$= 10^\circ$

Q3

Answer :

$(b) 45^\circ$

Suppose the angle is x°.
Then, the complement is also x°.
Complement of $x^\circ = 90^\circ - x^\circ$
$\Rightarrow x^\circ = 90^\circ - x^\circ$
$\Rightarrow x^\circ + x^\circ = 90^\circ$
$\Rightarrow 2x^\circ = 90^\circ$
$\Rightarrow x = \frac{90}{2}$
$\Rightarrow x = 45$

Q4

Answer :

$(a)\ 30^\circ$

Suppose the angle is x.

$x = \frac{(180-x)}{5}$

$\Rightarrow 5x = 180 - x$

$\Rightarrow 5x + x = 180$

$\Rightarrow x = \frac{180}{6}$

$\Rightarrow x = 30^\circ$

Q5

Answer :

$(b)\ 57^\circ$

Suppose the angle is x.

$x = 90 - x + 24$

$\Rightarrow x + x = 114$

$\Rightarrow 2x = 114$

$\Rightarrow x = \frac{114}{2}$

$\Rightarrow x = 57^\circ$

Q6

Answer :

$(b)\ 74^\circ$

Suppose the angle is x.

$x = 180 - x - 32$

$\Rightarrow x + x = 148$

$\Rightarrow 2x = 148$

$\Rightarrow x = \frac{148}{2}$

$\Rightarrow x = 74^\circ$

Q7

Answer :

$(c)\ 72^\circ$

Supplementary angles:

$3x + 2x = 180$

$=> x = \frac{180}{5}$

$\Rightarrow x = 36^\circ$

Smaller angle $= (2 \times 36^\circ)$

$= 72^\circ$

Q8

Answer :

$(b)\ 48^\circ$

$\angle AOC + \angle BOC = 180^\circ$ (linear pair)

$\angle AOC = 180^\circ - \angle BOC$

$= 180^\circ - 132^\circ$

$= 48^\circ$

Q9

Answer :

(x) 112

$\angle AOC + \angle AOB = 180^\circ$ (linear pair)

$68^\circ + x^\circ = 180^\circ$

$\Rightarrow x^\circ = 180^\circ - 68^\circ$

$\Rightarrow x^\circ = 112^\circ$

Q10

Answer :

$(c) x = 35$

$(2x - 10) + (3x + 15) = 180$
$\Rightarrow 2x - 10 + 3x + 15 = 180$
$\Rightarrow 5x + 5 = 180$
$\Rightarrow 5x = 180 - 5$
$\Rightarrow 5x = 175$
$\Rightarrow x = \frac{\cancel{175}^{35}}{\cancel{5}^{1}}$
$\Rightarrow x = 35$

Q11

Answer :

$(d)\ x = 80$
$x + 55 + 45 = 180$ (linear pair)
$\Rightarrow x = 180 - 55 - 45$
$\Rightarrow x = 180 - 100$
$\Rightarrow x = 80$

Q12

Answer :

$\left(a \right)$ 100

$x + y = 180$ (linear pair)
$\Rightarrow x + \frac{4}{5}x = 180^\circ$
$\Rightarrow 9x = 5 \times 180$
$\Rightarrow x = 100$

Q13

Answer :

$\left(\text{b} \right)$ 50°

Here, $\angle AOC$ and $\angle BOD$ are vertically opposite angles.
$\therefore \angle AOC = \angle BOD$
Given, $\angle AOC = 50^0$
$\therefore \angle BOD = 50^0$

Q14

Answer :

$\left(a \right)$ 32

$(3x - 8)^\circ + (x + 10)^\circ + 50^\circ = 180^\circ$ (linear pair)
$\Rightarrow 4x^\circ + 52^\circ = 180^\circ$
$\Rightarrow 4x^\circ = 128^\circ$
$\Rightarrow x^\circ = 32^\circ$

$\therefore x = 32$

Q15

Answer :

(a) 32

$(3x-8)^\circ+(x+10)^\circ+50^\circ=180^\circ$ (linear pair)

$\Rightarrow 4x^\circ+52^\circ=180^\circ$

$\Rightarrow 4x^\circ=128^\circ$

$\Rightarrow x^\circ=32^\circ$

$\therefore x=32$

Q16

Answer :

(c) 100°

$\angle ACB=\angle ABC+\angle BAC$ (exterior angle property)

$=(45^\circ+55^\circ)$

$=100^\circ$

Q17

Answer :

(b) 50°

$\angle BCA=180^0-120^0$ (linear pair)

$=60^0$

$\angle BAC=180^0-(60^0+70^0)$ (angle sum property of triangles)

$=50^0$

Q18

Answer :

(c) 150°

$x^0+70^0+50^0+90^0=360^0$ (complete angle)

$\Rightarrow x^0=360^0-210^0$

$=150^0$

Q19

Answer :

(c) 70°

Here, $\angle ACE=\angle BAC=50^0$ [alternate angles]

$\angle ACB+\angle ACE+\angle DCE=180^\circ$ (linear pair)

$\angle ACB=180^0-(50^\circ+60^\circ)$

$=180^\circ-110^\circ$

$=70^\circ$

Q20

Answer :

$\left(b \right)\ 30^\circ$

$$\angle A+\angle B+\angle C = 180^0$$
$$\Rightarrow \angle B = 180^0 - \left(65^0 + 85^0\right)$$
$$\Rightarrow \angle B = 180^0 - 150^0$$
$$\Rightarrow \angle B = 30^0$$

Q21

Answer :

(d) 1800

Q22

Answer :

(c) 360^0

Q23

Answer :

$\left(b \right)\ 90^\circ$

Draw a parallel line through O and produce AB and CD on R and P, respectively.

$\therefore \angle OCD = \angle COQ = 120^0$ (alternate angles)

$\angle COS = 180^0 - 120^0$ (linear pair)

$= 60^0$

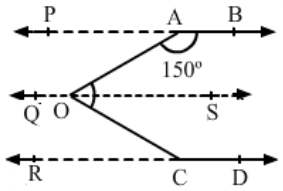
Similarly, $\angle AOQ = \angle BAO = 150^0$ (alternate angles)

$\angle AOS = 180^0 - 150^0$ (linear pair)

$= 30^0$

$\angle AOC = \angle AOS + \angle COS$

$\therefore \angle AOC = 60^0 + 30^0 = 90^0$



Q24

Answer :

$\left(a \right)\ 40^\circ$

$\angle PAC = \angle ACS = 100^0$ [alternate angles]

$$\angle PAB + \angle BAC = 100^0$$
$$\Rightarrow \angle BAC = 100^\circ - 60^\circ = 40^\circ$$

Q25

Answer :

c | 30

Here, $\angle DCG + \angle CGF = 180^0$ (angles on the same side of a transversal line are supplementary)

$\Rightarrow \angle CGF = 180^0 - 100^\circ = 80^\circ$

$\angle ABG = \angle BGF = 110^0$ [alternate angles]

$x^0 + \angle CGF = 110^0$

$\Rightarrow x^0 = 110^0 - 80^0$

$\Rightarrow x^0 = 30^0$

$\therefore x = 30$

Q26

Answer :

(d) greater than the 3rd side

Q27

Answer :

(d) The diagonals of a rhombus always bisect each other at right angles.

Q28

Answer :

c | 12 cm

In a right angle triangle:

$AC^2 = AB^2 + BC^2$ (Pythagoras theorem)

$\Rightarrow BC^2 = 13^2 - 5^2$

$\Rightarrow BC^2 = 169 - 25$

$\Rightarrow BC^2 = 144$

$\Rightarrow BC = \pm 12$

The length cannot be negative.

$\therefore BC = 12$ cm

Q29

Answer :

c | 114°

In triangle ABC:

$\angle A + \angle B + \angle C = 180^0$

$\Rightarrow \angle A = 180^0 - (37^0 + 29^0)$

$\Rightarrow \angle A = 180^0 - (66^0)$

$= 114^0$

Q30

Answer :

$(c)\ 105^{\circ}$

Suppose the angles of a triangle are $2x$, $3x$ and $7x$.

Sum of the angles of a triangle is 180°.

$2x + 3x + 7x = 180$

$\Rightarrow 12x = 180$

$\Rightarrow x = 15^{0}$

Measure of the largest angle $= 15^{0} \times 7 = 105^{0}$

Q31

$(c)\ 60^{\circ}$

Given :

$2\angle A = 3\angle B$ or $\angle A = \frac{3}{2}\angle B$

$3\angle B = 6\angle C$, or $\angle C = \frac{1}{2}\angle B$

In a $\triangle ABC$:

$\angle A + \angle B + \angle C = 180^{0}$

$\Rightarrow \frac{3}{2}\angle B + \angle B + \frac{1}{2}\angle B = 180^{0}$

$\Rightarrow \frac{3\angle B + 2\angle B + \angle B}{2} = 180^{0}$

$\Rightarrow \frac{6\angle B}{2} = 180^{0}$

$\Rightarrow \angle B = \frac{360^{0}}{6}$

$\Rightarrow \angle B = 60^{0}$

Q32

Answer :

$(a)\ 25^{\circ}$

Given :

$\angle A + \angle B = 65^{\circ}$

$\angle A = 65^{\circ} - \angle B \quad \ldots (i)$

$\angle B + \angle C = 140^{\circ}$

$\angle C = 140^{\circ} - \angle B \quad \ldots (ii)$

In $\triangle ABC$:

$\angle A + \angle B + \angle C = 180^{\circ}$

Putting the value of $\angle B$ **and** $\angle C$:

$\Rightarrow 65^{\circ} - \angle B + \angle B + 140^{\circ} - \angle B = 180^{\circ}$

$\Rightarrow -\angle B = 180^{\circ} - 205^{\circ}$

$\Rightarrow \angle B = 25^{\circ}$

Q33

Answer :

( ) b 55°

In $\triangle ABC$:

$\angle A + \angle B + \angle C = 180^0 \quad \ldots(i)$

Given:

$\angle A - \angle B = 33^0 => \angle A = \angle B + 33^0 \quad \ldots(ii)$

$\angle B - \angle C = 18^0 => \angle C = \angle B - 18^0 \quad \ldots(iii)$

Using (ii) and (iii) in equation (i) :

$=> \angle B + 33^0 + \angle B + \angle B - 18^0 = 180^0$

$=> 3\angle B + 15^0 = 180^0$

$=> 3\angle B = 165^0$

$=> \angle B = \frac{165^0}{3} = 55^0$

Q34

Answer :

( ) c 22

Sum of the angles of a triangle is 180°.

$(3x)^\circ + (2x - 7)^\circ + (4x - 11)^\circ = 180^\circ$

$=> 9x^\circ - 18^\circ = 180^\circ$

$=> 9x^\circ = 198^\circ$

$=> x^\circ = 22^\circ$

$\Rightarrow x = 22$

Q35

Answer :

( ) c 25 cm

In a right angle triangle ABC:

$AC^2 = BC^2 + AB^2$

$=> BC^2 = 24^2 + 7^2$

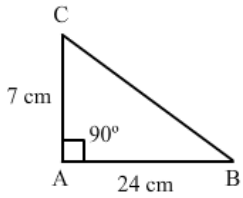
$=> BC^2 = 576 + 49$

$=> BC^2 = 625$

$=> BC = \pm 25$ cm

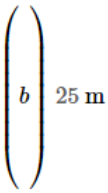
Since the length cannot be negative, we will negelect -25.

$\therefore$ BC $= 25$ cm



Q36

Answer :



In right triangle ABC:

$AC^2 = AB^2 + BC^2$

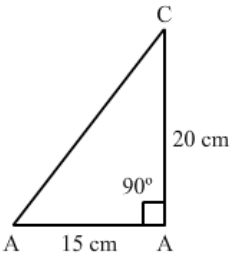
$= 15^2 + 20^2$

$\Rightarrow AC^2 = 625$

$\Rightarrow AC = \pm 25$

Since the length cannot be negative, we will negelect -25.

$\therefore$ Length of the ladder $= 25$ m



Q37

Answer :

(a) 13 m

Suppose there are two poles AE and BD.

$EC = AB = 12$ m $\quad$ (ABCE is a rectangle)

$AE = BC = 6$ m $\quad$ (ABCE is a rectangle)

$DC = BD - AE$

$= 11 - 6$

$= 5$ m

In the right angled triangle ECD :

$ED^2 = EC^2 + DC^2$ (Pythagoras theorem)

$ED^2 = 5^2 + 12^2$

$ED^2 = 25 + 144$

$ED^2 = 169$

$ED = \pm 13$

The length cannot be negative.

$\therefore ED = 13$ m

Q38

Answer :

d | $5\sqrt{2}$ cm

In right angled isoceles triangle, right angled at C, AC is equal to BC and AB is the hypotenuse.

$$AB^2 = AC^2 + BC^2$$
$$= 5^2 + 5^2$$
$$= 50$$
$$\therefore AB = \sqrt{2 \times 25} = 5\sqrt{2} \text{ cm}$$