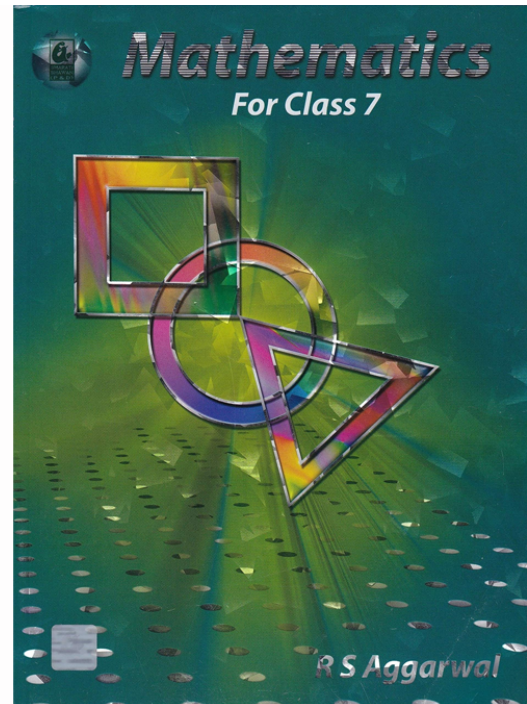


# RS Aggarwal Solutions for Class 7 Maths Chapter 17–Constructions

## Class 7 - Chapter 17 Constructions



For any clarifications or questions you can write to [info@indcareer.com](mailto:info@indcareer.com)

### Postal Address

IndCareer.com, 52, Shilpa Nagar, Somalwada Nagpur - 440015  
Maharashtra, India

**WhatsApp:** +91 9561 204 888, **Website:** <https://www.indcareer.com>

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# RS Aggarwal Solutions for Class 7

## Maths Chapter 17–Constructions

Class 7: Maths Chapter 17 solutions. Complete Class 7 Maths Chapter 17 Notes.

### RS Aggarwal Solutions for Class 7 Maths Chapter 17–Constructions

RS Aggarwal 7th Maths Chapter 17, Class 7 Maths Chapter 17 solutions

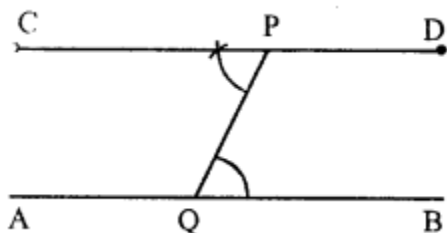
**Ex 17A**

**Question 1.**

**Solution:**

Steps of construction :

- (i) Draw a line segment AB
- (ii) From a point P outside AB, draw a line PQ meeting AB at Q.



- (iii) At P, draw a line PQ making an angle

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$\angle QPC$  equal to  $\angle PQB$  with the help of compass and ruler and produce it to D.

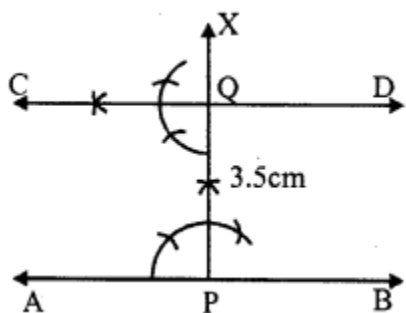
Then the line CD is parallel to AB. Which is the required line.

### Question 2.

#### Solution:

Steps of construction :

- (i) Draw a line AB and take a point P on it.
- (ii) From P, draw a perpendicular PX and cut off  $PQ = 3.5$  cm.
- (iii) From Q, draw a perpendicular line CD and produce it to both sides.



Then, CD is the required line which is parallel to AB.

### Question 3.

#### Solution:

Steps of construction :

- (i) Draw a line  $l$  and take a point P on it.
- (ii) At P, draw a perpendicular line PX and cut off  $PQ = 4.3$  cm.
- (iii) From Q, draw a line  $m$  which is perpendicular on PX, and produce it to both sides.

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Then  $m$  is the required line which is parallel to  $l$ .

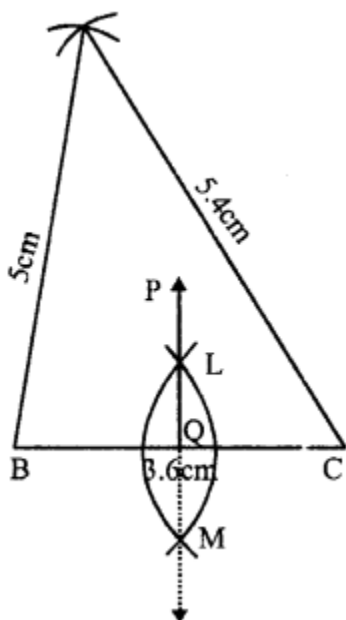
**Ex 17B**

**Question 1.**

**Solution:**

Steps of construction :

(i) Draw a line segment  $BC = 3.6\text{cm}$



(ii) At B, draw an arc of the radius  $5\text{cm}$ .

(iii) At C, draw another arc of the radius  $5.4\text{cm}$  which intersects the first arc at A

(iv) Join AB and AC

(v) With centre B and C and radius more than half of BC, draw arcs intersecting each other at L and M.

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(vi) Join LM which intersects BC at Q and produce it to P.

Then PQ is perpendicular bisector of side BC.

### Question 2.

#### Solution:

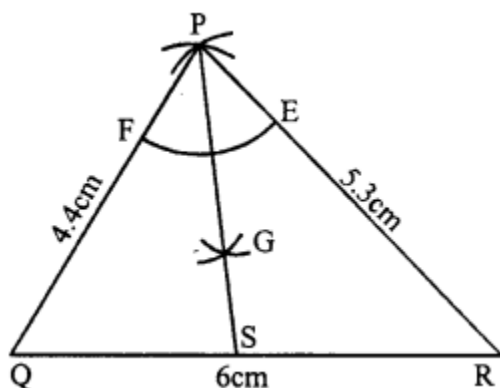
Steps of construction :

(i) Draw a line segment QR = 6cm

(ii) With centre Q and radius 4.4 cm draw an arc.

(iii) With centre R and radius 5.3 cm, draw another arc intersecting the first arc at P.

(iv) Join PQ and PR.



(v) With centre P and a suitable radius, draw an arc meeting PR at E and PQ at F.

(vi) With centres E and F, with same radius, draw two arcs intersecting each other at G.

(vii) Join PG and produce it to meet QR at S. Then PS is the bisector of  $\angle P$ .

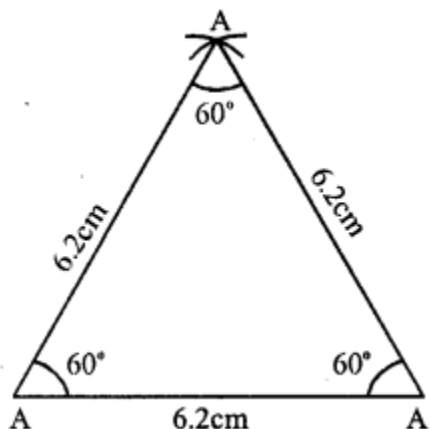
### Question 3.

#### Solution:

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Steps of construction :

- (i) Draw a line segment  $BC = 6.2$  cm.
- (ii) With centres B and C radius 6.2 cm, draw arcs intersecting each other at A.
- (iii) Join AB and AC.



$\triangle ABC$  is the required equilateral triangle.

On measuring, each angle is equal to  $60^\circ$ .

#### Question 4.

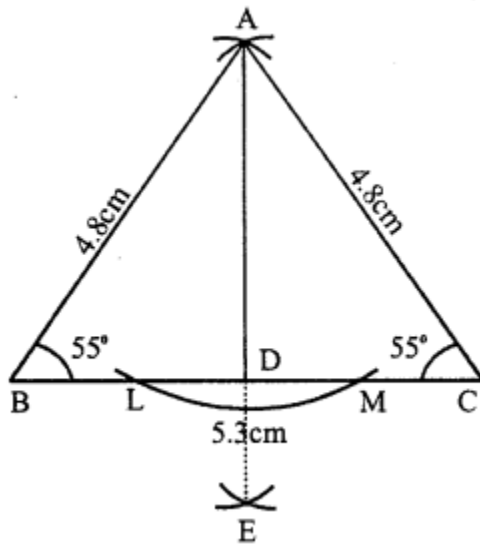
**Solution:**

Steps of construction :

- (i) Draw a line segment  $BC = 5.3$  cm.
- (ii) With centre B and C, and radius 4.8 cm, draw arcs intersecting each other at A
- (iii) Join AB and AC, Then  $\triangle ABC$  is the required triangle.
- (iv) Now, with centre A and a suitable radius draw an arc intersecting BC at L and M.

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- (v) Then with centre L and M, draw two arcs intersecting each other at E.
- (vi) Join AE intersecting BC at D. Then AD is perpendicular to BC.



On measuring  $\angle B$  and  $\angle C$ , each is equal to  $55^\circ$ .

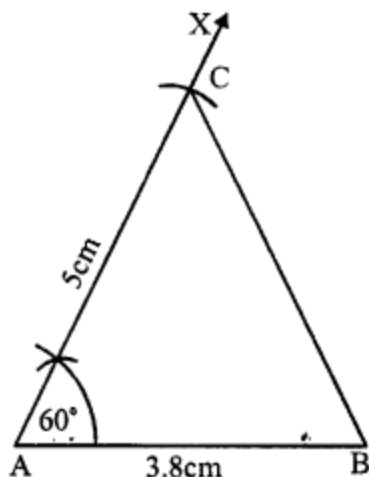
#### Question 5.

##### Solution:

Steps of construction :

- (i) Draw a line segment  $AB = 3.8\text{cm}$ .
- (ii) At A draw a ray AX making an angle of  $60^\circ$ .

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(iii) Cut off  $AC = 5$  cm from  $AX$

(iv) Join  $CB$ .

Then  $\triangle ABC$  is the required triangle.

### Question 6.

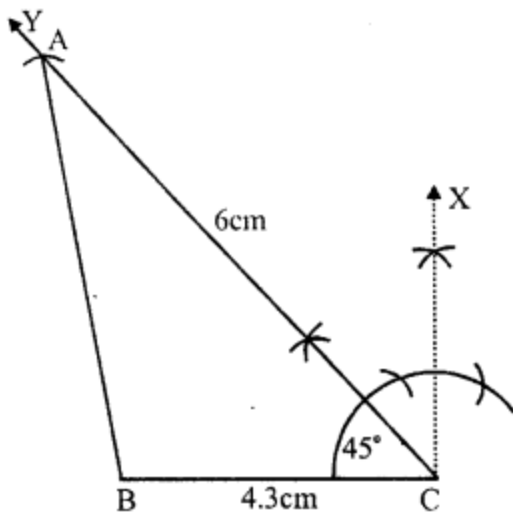
#### Solution:

Steps of construction :

(i) Draw a line segment  $BC = 4.3$  cm.

(ii) At  $C$ , draw a ray  $CY$  making an angle equal to  $45^\circ$ .

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(iii) With centre C, and radius 6cm, draw an arc intersecting CY at A.

(iv) Join AB.

Then  $\triangle ABC$  is the required triangle.

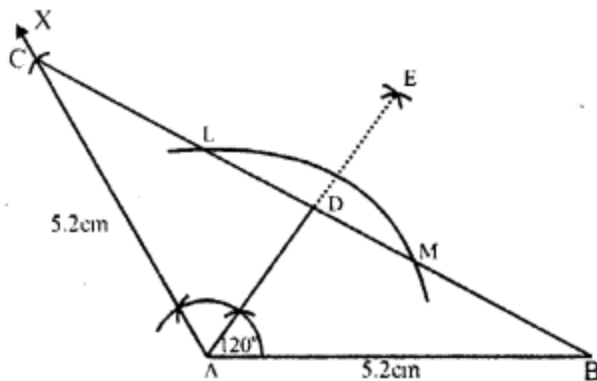
#### Question 7.

#### Solution:

(i) Draw a line segment  $AB = 5.2\text{cm}$ .

(ii) At A, draw a ray AX making an angle equal to  $120^\circ$ .

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(iii) From AX cut off  $AC = 5.2\text{cm}$ .

(iv) Join BC.

Then  $\triangle ABC$  is the required triangle.

(v) With centre A and some suitable radius draw an arc intersecting BC at L and M.

(vi) With centres L and M, draw two arcs intersecting each other at E.

(vii) Join AE intersecting BC at D Then AD is the perpendicular to BC.

### Question 8.

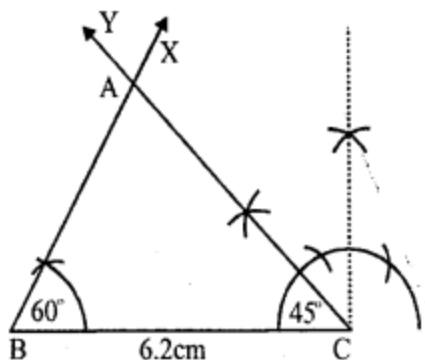
#### Solution:

Steps of construction :

(i) Draw a line segment  $BC = 6.2\text{ cm}$ .

(ii) At B draw a ray BX making an angle of  $60^\circ$ .

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(iii) At C draw another ray CY making an angle of  $45^\circ$  which intersect the ray BX at A. .

Then  $\triangle ABC$  is the required triangle.

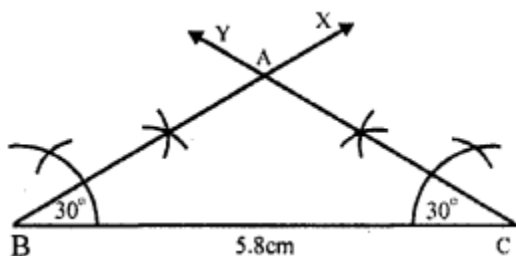
### Question 9.

#### Solution:

Steps of construction :

(i) Draw a line segment  $BC = 5.8$  cm.

(ii) At B draw a ray BX making an angle of  $30^\circ$



(iii) At C draw another ray CY making an angle of  $30^\circ$  intersecting the BX at A

Then  $\triangle ABC$  is the required triangle.

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On measuring AB and AC,  $AB = 3.5\text{cm}$  and  $AC = 3.5\text{cm}$ .

$$AB = AC$$

$\triangle ABC$  is an isosceles triangle.

#### Question 10.

##### Solution:

Steps of construction :

In  $\triangle ABC$ ,  $\angle A = 45^\circ$  and  $\angle C = 75^\circ$

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

$$\Rightarrow 45^\circ + \angle B + 75^\circ = 180^\circ$$

$$\Rightarrow \angle B = 180^\circ - 45^\circ - 75^\circ$$

$$\Rightarrow \angle B = 180^\circ - 120^\circ = 60^\circ$$

(i) Draw a line segment  $AB = 7\text{cm}$ .

(ii) At A, draw a ray AX making an angle of  $45^\circ$ .

(iii) At B, draw another ray BY making an angle of  $60^\circ$  which intersects AX at C

Then  $\triangle ABC$  is the required triangle.

#### Question 11.

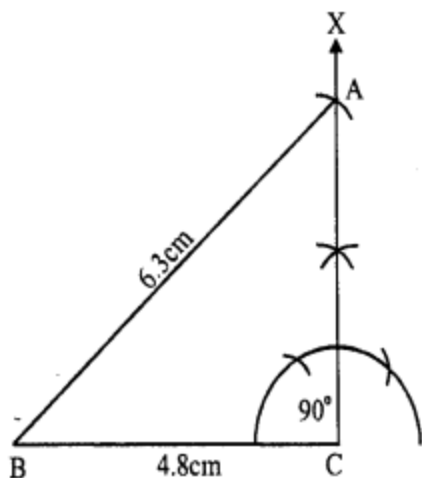
##### Solution:

Steps of construction :

(i) Draw a line segment  $BC = 4.8\text{ cm}$

(ii) At C, draw a ray CX making an angle of  $90^\circ$ .

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(iii) With centre B, an radius 6.3cm draw an arc intersecting CX at A.

(iv) Join AB.

Then  $\triangle ABC$  is the required triangle.

### Question 12.

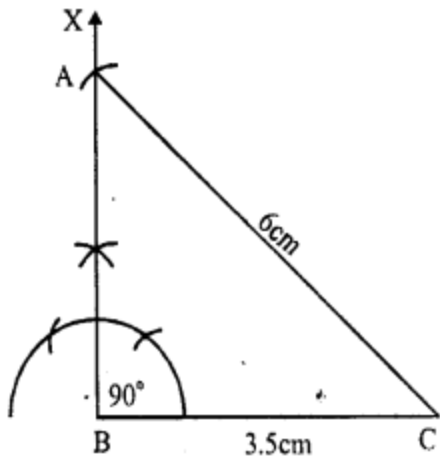
#### Solution:

Steps of construction :

(i) Draw a line segment  $BC = 3.5\text{cm}$

(ii) At B, draw a ray BX making an angle of  $90^\circ$ .

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(iii) With centre C and radius 6cm draw an arc intersecting BX at A

(iv) Join AC.

Then  $\triangle ABC$  is the required triangle.

### Question 13.

#### Solution:

One acute angle =  $30^\circ$ , then

second acute angle will be =  $90^\circ - 30^\circ = 60^\circ$  (Sum of acute angles =  $90^\circ$ )

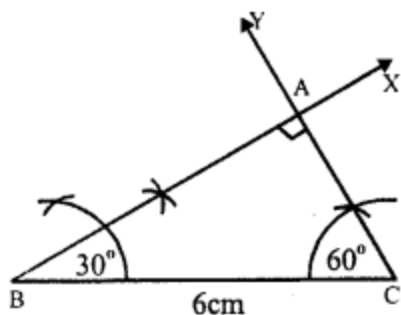
Steps of construction :

(i) Draw a line segment  $BC = 6\text{cm}$ .

(ii) At B draw a ray BX making an angle of  $30^\circ$ .

(iii) At C draw another ray CY making an angle of  $60^\circ$  which intersects BX at A

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Then  $\triangle ABC$  is the required triangle.

**Ex 17C**

**Mark (✓) against the correct answer in each of the following:**

**Question 1.**

**Solution:**

(c) Supplement of  $45^\circ$  is  $135^\circ$

$$135^\circ + 45^\circ = 180^\circ$$

**Question 2.**

**Solution:**

(b) Complement of  $80^\circ$  is  $10^\circ$

$$10^\circ + 80^\circ = 90^\circ$$

**Question 3.**

**Solution:**

(b) The angle is its own complement.

The measure of the angles will be  $45^\circ$  ( $45^\circ + 45^\circ = 90^\circ$ )

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**Question 4.****Solution:**

(a) The angle is one-fifth of its supplement

Let angle be  $x$ , then

$$x + 5x = 180^\circ$$

$$\Rightarrow 6x = 180^\circ$$

$$\Rightarrow x = 30^\circ$$

Angle is  $30^\circ$

**Question 5.****Solution:**

(b) Let angle is  $x$

Then its complement angle  $= x - 24^\circ$  But  $x + x - 24^\circ = 90^\circ$

$$\Rightarrow 2x = 90^\circ + 24^\circ = 114^\circ$$

$$\Rightarrow x = 57^\circ$$

The required angle is  $57^\circ$

**Question 6.****Solution:**

(b) Let required angle  $= x$

Then its supplement angle  $= x + 32$

$$\text{But } x + x + 32^\circ = 180^\circ$$

$$\Rightarrow 2x = 180^\circ - 32 = 148^\circ$$

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$$\Rightarrow x = 74^\circ$$

Required angle =  $74^\circ$

**Question 7.**

**Solution:**

(c) Two supplementary angle are in the ratio = 3 : 2

Let first angle =  $3x$

Second angle =  $2x$

$$\text{But } 3x + 2x = 180^\circ$$

$$\Rightarrow 5x = 180^\circ$$

$$\Rightarrow x = 36^\circ$$

$$\text{Smaller angle} = 2x = 2 \times 36^\circ = 72^\circ$$

**Question 8.**

**Solution:**

(b) In the figure  $\angle BOC = 132^\circ$

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

$$\Rightarrow \angle AOC + 132^\circ = 180^\circ$$

$$\Rightarrow \angle AOC = 180^\circ - 132^\circ = 48^\circ$$

**Question 9.**

**Solution:**

(c) In the figure,  $\angle AOC = 68^\circ$

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

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

$$\Rightarrow x = 180^\circ - 68^\circ = 112^\circ$$

**Question 10.****Solution:**

(b) In the figure,

AOB is a straight line

$$\angle AOC + \angle BOC = 180^\circ \text{ (Linear pair)}$$

$$\Rightarrow 2x - 10^\circ + 3x + 15^\circ = 180^\circ$$

$$\Rightarrow 5x = 180^\circ + 10^\circ - 15^\circ = 175^\circ$$

$$\Rightarrow x = 35^\circ$$

$$x = 35$$

**Question 11.****Solution:**

(d) In the figure,

AOB is a straight line

$$\angle AOC + \angle COD + \angle DOB = 180^\circ$$

$$\Rightarrow 55^\circ + x + 45^\circ = 180^\circ$$

$$\Rightarrow x + 100^\circ = 180^\circ$$

$$\Rightarrow x = 180^\circ - 100^\circ = 80^\circ$$

**Question 12.****Solution:**

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(a) AOB is a straight line

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

$$\text{But } 4x = 5y$$

$$\Rightarrow x = \frac{5}{4}y$$

$$\therefore \frac{5}{4}y + y = 180^\circ$$

$$\frac{5y + 4y}{4} = 180^\circ \Rightarrow \frac{9y}{4} = 180^\circ$$

$$y = \frac{180^\circ \times 4}{9} = 80^\circ$$

$$\therefore x = \frac{5}{4}y = \frac{5}{4} \times 80 = 100^\circ$$

**Question 13.**

**Solution:**

(b) AB and CD intersect each other at O and  $\angle AOC = 50^\circ$

$\angle BOD = \angle AOC = 50^\circ$  (Vertically opposite angles)

**Question 14.**

**Solution:**

(a) AOB is a straight line

$$\angle AOC + \angle COD + \angle DOB = 180^\circ$$

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$$\Rightarrow 3x - 8^\circ + 50^\circ + x + 10^\circ = 180^\circ$$

$$\Rightarrow 4x = 180^\circ + 8^\circ - 50^\circ - 10^\circ$$

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

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

**Question 15.****Solution:**

(b) In  $\triangle ABC$ , side BC is produced to D

$$\angle ACD = 132^\circ \text{ and } \angle A = 54^\circ$$

$$\text{Ext. } \angle ACD = \angle A + \angle B$$

$$\Rightarrow 132^\circ = 54^\circ + \angle B$$

$$\Rightarrow \angle B = 132^\circ - 54^\circ = 78^\circ$$

**Question 16.****Solution:**

(c) In  $\triangle ABC$ ,

Side BC is produced to D

$$\angle A = 45^\circ, \angle B = 55^\circ$$

$$\text{Ext. } \angle ACD = \angle A + \angle B = 45^\circ + 55^\circ = 100^\circ$$

**Question 17.****Solution:**

(b) In  $\triangle ABC$ , side BC is produced to D

$$\angle ABC = 70^\circ \text{ and } \angle ACD = 120^\circ$$

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$$\text{Ext. } \angle ACD = \angle BAC + \angle ABC$$

$$\Rightarrow 120^\circ = \angle BAC + 70^\circ$$

$$\Rightarrow \angle BAC = 120^\circ - 70^\circ = 50^\circ$$

**Question 18.****Solution:**

(c) In the figure,

$$\angle AOB = 50^\circ, \angle BOC = 90^\circ$$

$$\angle COD = 70^\circ, \angle AOD = x.$$

But  $\angle AOB + \angle BOC + \angle COD + \angle DOA = 360^\circ$  (Angles at a point)

$$\Rightarrow 50^\circ + 90^\circ + 70^\circ + x = 360^\circ$$

$$\Rightarrow 210 + x = 360^\circ$$

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

$$\Rightarrow x = 150^\circ$$

**Question 19.****Solution:**

(c) In the figure,

Side BC of  $\triangle ABC$  is produced to D

CE || BA is drawn

$$\angle A = 50^\circ \text{ and } \angle ECD = 60^\circ$$

AB || CE

$$\angle ABC = \angle ECD \text{ (corresponding angle)} = 60^\circ$$

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But in  $\triangle ABC$ ,

$$\angle A + \angle B + \angle ACB = 180^\circ \text{ (Angles of a triangles)}$$

$$\Rightarrow 50^\circ + 60^\circ + \angle ACB = 180^\circ$$

$$\Rightarrow \angle ACB = 180^\circ - 50^\circ - 60^\circ = 70^\circ$$

**Question 20.**

**Solution:**

(b) In  $\triangle ABC$ ,

$$\angle A = 65^\circ, \angle C = 85^\circ$$

But  $\angle A + \angle B + \angle C = 180^\circ$  (Angles of a triangle)

$$\Rightarrow 65^\circ + \angle B + 85^\circ = 180^\circ$$

$$\Rightarrow 150^\circ + \angle B = 180^\circ$$

$$\Rightarrow \angle B = 180^\circ - 150^\circ = 30^\circ$$

**Question 21.**

**Solution:**

(d) Sum of angles of a triangle =  $180^\circ$

**Question 22.**

**Solution:**

(c) Sum of angles of a quadrilateral =  $360^\circ$

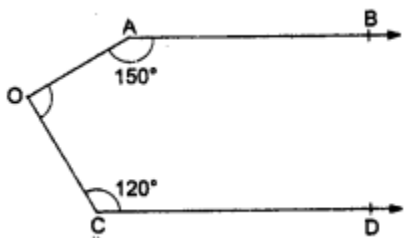
**Question 23.**

**Solution:**

(b) In the figure,  $AB \parallel CD$

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$$\angle OAB = 150^\circ, \angle OCD = 120^\circ$$



From O, draw  $OE \parallel AB$  or  $CD$

$AB \parallel DE$

$$\angle OAB + \angle AOE = 180^\circ$$

$$\Rightarrow 150^\circ + \angle AOE = 180^\circ$$

$$\Rightarrow \angle AOE = 180^\circ - 150^\circ = 30^\circ$$

Similarly  $DE \parallel CD$

$$\angle EOC + \angle OCD = 180^\circ$$

$$\Rightarrow \angle EOC + 120^\circ = 180^\circ$$

$$\Rightarrow \angle EOC = 180^\circ - 120^\circ = 60^\circ$$

$$\text{Now } \angle AOC = \angle AOE + \angle EOC = 30^\circ + 60^\circ = 90^\circ$$

**Question 24.**

**Solution:**

(a) In the given figure,

$PQ \parallel RS$ ,

$$\angle PAB = 60^\circ \text{ and } \angle ACS = 100^\circ$$

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$PQ \parallel RS$

$$\angle ABC = \angle PAB \text{ (alternate angles)} = 60^\circ$$

$$\text{But Ext. } \angle ACS = \angle BAC + \angle ABC$$

$$\Rightarrow 100^\circ = \angle BAC + 60^\circ$$

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

**Question 25.**

**Solution:**

(c) In the figure,  $AB \parallel CD \parallel EF$

$$\angle ABG = 110^\circ \text{ and } \angle GCD = 100^\circ$$

$$\angle BGC = x^\circ$$

$AB \parallel EF$

$$\angle ABG + \angle BGE = 180^\circ$$

$$\Rightarrow 110^\circ + \angle BGE = 180^\circ$$

$$\Rightarrow \angle BGE = 180^\circ - 110^\circ = 70^\circ$$

Similarly  $CD \parallel EF$

$$\angle GCD + \angle CGF = 180^\circ$$

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

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

$$\text{But } \angle BGE + \angle BGC + \angle CGF = 180^\circ$$

$$\Rightarrow 70^\circ + x + 80^\circ = 180^\circ$$

$$\Rightarrow 150^\circ + x = 180^\circ$$

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$$\Rightarrow x = 180^\circ - 150^\circ = 30^\circ$$

**Question 26.****Solution:**

(d) Sum of any two sides of a triangle is always greater than the third side

**Question 27.****Solution:**

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

**Question 28.****Solution:**

(c) In  $\triangle ABC$ ,  $\angle B = 90^\circ$

$AB = 5$  cm and  $AC = 13$  cm

But  $AC^2 = AB^2 + BC^2$  (By Pythagoras Theorem)

$$\Rightarrow (13)^2 = (5)^2 + BC^2$$

$$\Rightarrow 169 = 25 + BC^2$$

$$\Rightarrow BC^2 = 169 - 25 = 144 = (12)^2$$

$BC = 12$  cm

**Question 29.****Solution:**

(c) In  $\triangle ABC$ ,  $\angle B = 37^\circ$ ,  $\angle C = 29^\circ$

But  $\angle A + \angle B + \angle C = 180^\circ$  (angles of a triangle)

$$\Rightarrow \angle A + 37^\circ + 29^\circ = 180^\circ$$

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$$\Rightarrow \angle A + 66^\circ = 180^\circ$$

$$\Rightarrow \angle A = 180^\circ - 66^\circ = 114^\circ$$

**Question 30.**

**Solution:**

(c) The ratio of angles of a triangle is 2 : 3 : 7

But sum of angles of a triangle =  $180^\circ$

$$\therefore \text{Measure of largest angle} = \frac{180^\circ \times 7}{2+3+7}$$

$$= \frac{180^\circ \times 7}{12} = 105^\circ$$

**Question 31.**

**Solution:**

In  $\triangle ABC$ ,

$$\text{Let } 2\angle A = 3\angle B = 6\angle C = x$$

$$\therefore \angle A = \frac{1}{2}x, \angle B = \frac{1}{3}x, \angle C = \frac{1}{6}x$$

$$\therefore \text{Ratio in A, B and C} = \frac{1}{2} : \frac{1}{3} : \frac{1}{6}$$

$$= \frac{3:2:1}{6}$$

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

(Angles of a triangle)

$$\therefore \angle B = \frac{180^\circ \times 2}{3+2+1} = \frac{180^\circ \times 2}{6} = 60^\circ$$

**Question 32.**

**Solution:**

(a) In  $\triangle ABC$ ,

$$\angle A + \angle B = 65^\circ, \angle B + \angle C = 140^\circ$$

$$\angle A = 65^\circ$$

$$\angle C = 140^\circ - \angle B$$

$$\text{But } \angle A + \angle B + \angle C = 180^\circ \text{ (Angles of a triangle)}$$

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

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

$$\Rightarrow \angle B = 205^\circ - 180^\circ = 25^\circ$$

**Question 33.**

**Solution:**

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(b) In  $\triangle ABC$ ,  $\angle A - \angle B = 33^\circ$

and  $\angle B - \angle C = 18^\circ$

$$\angle A = 33^\circ + \angle B \text{ and } \angle C = \angle B - 18^\circ$$

But  $\angle A + \angle B + \angle C = 180^\circ$

$$\Rightarrow 33^\circ + \angle B + \angle B + \angle B - 18^\circ = 180^\circ$$

$$\Rightarrow 3\angle B = 180^\circ - 33^\circ + 18^\circ = 165^\circ$$

$$\Rightarrow \angle B = 55^\circ$$

**Question 34.**

**Solution:**

(c) In  $\triangle ABC$

$$\angle A + \angle B + \angle C = 180^\circ \text{ (Sum of angles of a triangle)}$$

But angles are  $(3x)^\circ$ ,  $(2x - 7)^\circ$  and  $(4x - 11)^\circ$

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

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

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

$$\Rightarrow 9x = 180^\circ + 18^\circ = 198^\circ$$

$$\Rightarrow x = 22^\circ$$

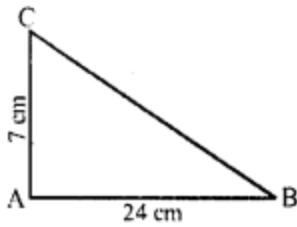
**Question 35.**

**Solution:**

(c)  $\triangle ABC$  is a right angled,  $\angle A = 90^\circ$

$AB = 24 \text{ cm}$ ,  $AC = 7 \text{ cm}$

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

$$\Rightarrow BC^2 = (24)^2 + (7)^2 = 576 + 49 = 625 = (25)^2$$

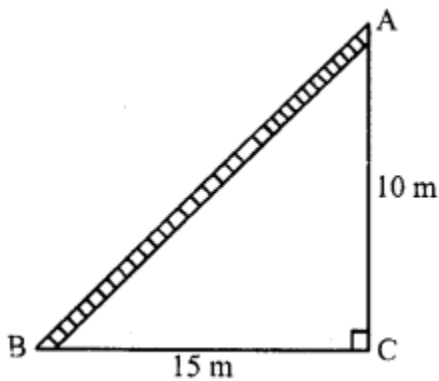
$$BC = 25 \text{ cm}$$

**Question 36.**

**Solution:**

(b) Let AB is a ladder and A is the window

$$BC = 15 \text{ m}, AC = 20 \text{ m}$$



Now in right  $\triangle ABC$

$$AB^2 = BC^2 + AC^2 = (15)^2 + (20)^2 = 225 + 400 = 625 = (25)^2$$

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AB = 25 m

Length of ladder = 25 m

**Question 37.**

**Solution:**

(a) Let AB and CD are two poles such that

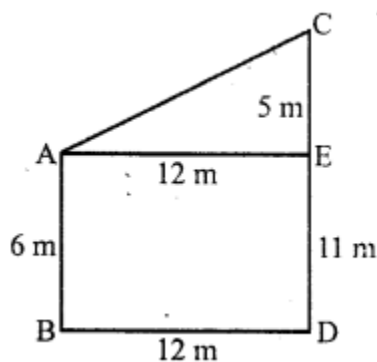
AB = 6 m, CD = 11 m

and distance between two poles BD = 12m

From A, draw AE || BD

AE = BD = 12m

CE = CD – ED = 11 – 6 = 5 m



Now in right  $\triangle AEC$

$$AC^2 = AE^2 + CE^2 = (12)^2 + (5)^2 = 144 + 25 = 169 = (13)^2$$

AC = 13 m

Distance between tops of poles = 13 m

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**Question 38.****Solution:**

(d)  $\triangle ABC$  is an isosceles triangle

$$\angle C = 90^\circ,$$

$$AC = 5 \text{ cm}$$

$$BC = AC = 5 \text{ cm}$$

In right  $\triangle ABC$

$$AB^2 = AC^2 + BC^2 = (5)^2 + (5)^2 = 25 + 25 = 50 = 2 \times 25$$

$$AB = \sqrt{2 \times 25} = 5\sqrt{2} \text{ cm}$$



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- Chapter 4–Rational Numbers
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- Chapter 12–Simple Interest
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He was born on January 2, 1946 in a village of Delhi. He graduated from Kirori Mal College, University of Delhi. After completing his M.Sc. in Mathematics in 1969, he joined N.A.S. College, Meerut, as a lecturer. In 1976, he was awarded a fellowship for 3 years and joined the University of Delhi for his Ph.D. Thereafter, he was promoted as a reader in N.A.S. College, Meerut. In 1999, he joined M.M.H. College, Ghaziabad, as a reader and took voluntary retirement in 2003. He has authored more than 75 titles ranging from Nursery to M. Sc. He has also written books for competitive examinations right from the clerical grade to the I.A.S. level.

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### Postal Address

IndCareer.com  
52, Shilpa Nagar,  
Somalwada  
Nagpur - 440015  
Maharashtra, India

**WhatsApp:** +91 9561 204 888

**Website:** <https://www.indcareer.com>

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