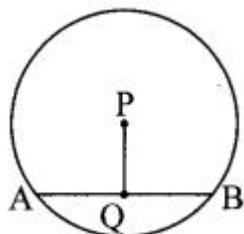


Practice Set 17.1 8th Std Maths Answers Chapter 17 Circle: Chord and Arc

Question 1.

In a circle with centre P, chord AB is drawn of length 13 cm, seg PQ \perp chord AB, then find l(QB)



Solution:

seg PQ \perp chord AB ... [Given]

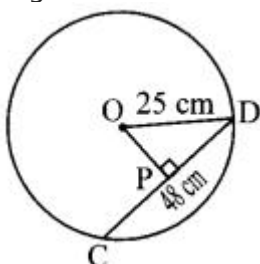
$\therefore l(QB) = \frac{1}{2} l(AB)$... [Perpendicular drawn from the centre of a circle to its chord bisects the chord]

$\therefore l(QB) = \frac{1}{2} \times 13$... [$\because l(AB) = 13$ cm]

$\therefore l(QB) = 6.5$ cm

Question 2.

Radius of a circle with centre O is 25 cm. Find the distance of a chord from the centre if length of the chord is 48 cm.



Solution:

seg OP \perp chord CD ... [Given]

$\therefore l(PD) = \frac{1}{2} l(CD)$... [Perpendicular drawn from the centre of a circle to its chord bisects the chord]

$\therefore l(PD) = \frac{1}{2} \times 48$... [$\because l(CD) = 48$ cm]

$\therefore l(PD) = 24$ cm ... (i)

In $\triangle OPD$, $m\angle OPD = 90^\circ$

$\therefore [l(OD)]^2 = [l(OP)]^2 + [l(PD)]^2$... [Pythagoras theorem]

$\therefore (25)^2 = [l(OP)]^2 + (24)^2$... [From (i) and $l(OD) = 25$ cm]

$\therefore (25)^2 - (24)^2 = [l(OP)]^2$

$\therefore (25 + 24)(25 - 24) = [l(OP)]^2$... [$\because a^2 - b^2 = (a + b)(a - b)$]

$\therefore 49 \times 1 = [l(OP)]^2$

$\therefore [l(OP)]^2 = 49$

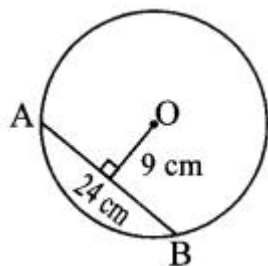
$\therefore l(OP) = \sqrt{49}$... [Taking square root of both sides]

$\therefore l(OP) = 7$ cm

\therefore The distance of the chord from the centre of the circle is 7 cm.

Question 3.

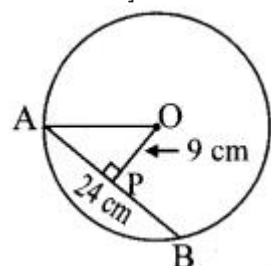
O is centre of the circle. Find the length of radius, if the chord of length 24 cm is at a distance of 9 cm from the centre of the



Solution:

Let seg $OP \perp$ chord AB

$\therefore l(AP) = \frac{1}{2} l(AB) \dots$ [Perpendicular drawn from the centre of a circle to its chord bisects the chord]



$$\therefore l(AP) = \frac{1}{2} \times 24 \dots [\because l(AB) = 24 \text{ cm}]$$

$$\therefore l(AP) = 12 \text{ cm} \dots (i)$$

In $\triangle OPA$, $m\angle OPA = 90^\circ$

$$\therefore [l(AO)]^2 = [l(OP)]^2 + [l(AP)]^2 \dots \text{[Pythagoras theorem]}$$

$$\therefore [l(AO)]^2 = (9)^2 + (12)^2 \dots \text{[From (i) and } l(OP) = 9 \text{ cm]}$$

$$= 81 + 144$$

$$\therefore [l(AO)]^2 = 225$$

$$\therefore l(AO) = \sqrt{225} \dots \text{[Taking square root of both sides]}$$

$$\therefore l(AO) = 15 \text{ cm}$$

\therefore The length of radius of the circle is 15 cm.

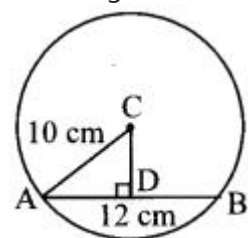
Question 4.

C is the centre of the circle whose radius is 10 cm. Find the distance of the chord from the centre if the length of the chord is 12 cm.

Solution:

Let seg AB be the chord of the circle with centre C.

Draw seg $CD \perp$ chord AB.



$\therefore l(AD) = \frac{1}{2} l(AB) \dots$ [Perpendicular drawn from the centre of a circle to its chord bisects the chord]

$$= \frac{1}{2} \times 12 \dots [\because l(AB) = 12 \text{ cm}]$$

$$\therefore l(AD) = 6 \text{ cm} \dots(i)$$

$$\therefore \text{In } \triangle ACD, m\angle ADC = 90^\circ$$

$$\therefore [l(AC)]^2 = [l(AD)]^2 + [l(CD)]^2 \dots [\text{Pythagoras theorem}]$$

$$\therefore (10)^2 = (6)^2 + [l(CD)]^2 \dots [\text{From (i) and } l(AC) = 10 \text{ cm}]$$

$$\therefore (10)^2 - (6)^2 = [l(CD)]^2$$

$$\therefore 100 - 36 = [l(CD)]^2$$

$$\therefore 64 = [l(CD)]^2$$

$$\text{i. e. } [l(CD)]^2 = 64$$

$$\therefore l(CD) = \sqrt{64} \dots [\text{Taking square root of both sides}]$$

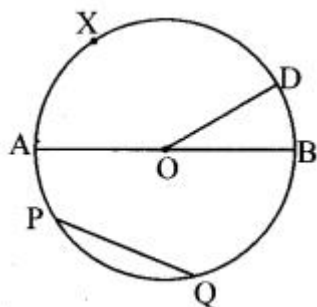
$$\therefore l(CD) = 8 \text{ cm}$$

\therefore The distance of the chord from the centre of the circle is 8 cm.

Maharashtra Board Class 8 Maths Chapter 17 Circle: Chord and Arc Practice Set 17.1 Intext Questions and Activities

Question 1.

In the given figure, O is the centre of the circle. With reference to the figure fill in the blanks. (Textbook pg. No. 114)



Solution:

1. Seg OD is radius of the circle.
2. Seg AB is diameter of the circle.
3. Seg PQ is chord of the circle.
4. $\angle DOB$ is the central angle.
5. Minor arc : arc AXD, arc BD, arc AP, arc PQ, arc BQ, etc.
6. Major arc : arc PAB, arc PDQ, arc PDB, arc ADQ, etc.
7. Semicircular arc : arc ADB, arc AQB.
8. $m(\text{arc DB}) = m\angle DOB$
9. $m(\text{arc DAB}) = 360^\circ - m\angle DOB$

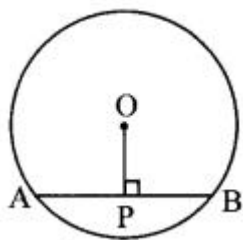
Question 2.

Draw chord AB of a circle with centre O. Draw perpendicular OP to chord AB. Measure seg AP and seg PB. What do you observe. (Textbook pg. no. 114)

Solution:

$$l(AP) = l(PB) = 0.9 \text{ cm}$$

∴ the perpendicular drawn from the centre of the circle to its chord bisects the chord.



Question 3.

Draw five circles with different radii. Draw a chord and perpendicular from the centre to each chord in each circle. Verify with a divider that the two parts of the chords are equal. (Textbook pg. no. 114)

Solution:

[Students should attempt the above activities on their own.]

Question 4.

Draw five circles of different radii on a paper. Draw a chord in each circle. Find the midpoint of each chord. Join the centre of the circle and midpoint of the chord as shown in the figure. Name the chord as AB and midpoint of the chord as P. Check with set-square or protractor that $\angle APO$ or $\angle BPO$ are right angles.

Check whether the same result is observed for the chord of each circle. (Textbook pg, no. 115)

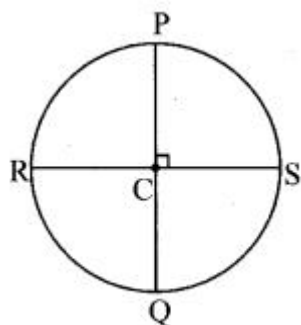
Solution:

[Students should attempt the above activities on their own.]

Practice Set 17.2 8th Std Maths Answers Chapter 17 Circle: Chord and Arc

Question 1.

The diameters PQ and RS of the circle with centre C are perpendicular to each other at C. State, why arc PS and arc SQ are congruent. Write the other arcs which are congruent to arc PS.



Solution:

diameter PQ \perp diameter RS ... [Given]

$$\therefore m\angle PCS = m\angle SCQ = m\angle PCR = m\angle RCQ = 90^\circ$$

The measure of the angle subtended at the centre by an arc is the measure of the arc.

$$\therefore m(\text{arc PS}) = m\angle PCS = 90^\circ \dots (i)$$

$$m(\text{arc SQ}) = m\angle SCQ = 90^\circ \dots (ii)$$

$$\therefore m(\text{arc PS}) = m(\text{arc SQ}) \dots [\text{From (i) and (ii)}]$$

$\therefore \text{arc PS} \cong \text{arc SQ} \dots [\text{If the measures of two arcs of a circle are same, then the two arcs are congruent}]$

$$m(\text{arc PR}) = m\angle PCR = 90^\circ \dots (iii)$$

$$m(\text{arc RQ}) = m\angle RCQ = 90^\circ \dots (iv)$$

$$\therefore m(\text{arc PS}) = m(\text{arc PR}) = m(\text{arc RQ}) \dots [\text{From (i), (iii) and (iv)}]$$

$$\therefore \text{arc PS} \cong \text{arc PR} \cong \text{arc RQ}$$

$\dots [\text{If the measures of two arcs of a circle are same, then the two arcs are congruent}]$

$\therefore \text{arc PR and arc RQ are congruent to arc PS.}$

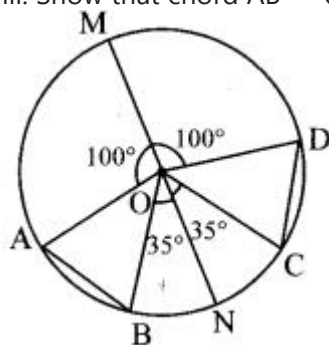
Question 2.

In the given figure, O is the centre of the circle whose diameter is MN. Measures of some central angles are given in the figure.

i. $m\angle AOB$ and $m\angle COD$

ii. Show that $\text{arc AB} \cong \text{arc CD}$

iii. Show that $\text{chord AB} \cong \text{chord CD}$



Solution:

i. Seg MN is the diameter of the circle. ... [Given]

$$\therefore m\angle AOM + m\angle AON = 180^\circ \dots [\text{Angles in a linear pair}]$$

$$\therefore m\angle AOM + (m\angle AOB + m\angle BON) = 180^\circ \dots [\text{Angle addition property}]$$

$$\therefore 100^\circ + m\angle AOB + 35^\circ = 180^\circ$$

$$\dots [\because m\angle AOM = 100^\circ, m\angle BON = 35^\circ]$$

$$\therefore m\angle AOB + 135^\circ = 180^\circ$$

$$\therefore m\angle AOB = 180^\circ - 135^\circ$$

$$\therefore m\angle AOB = 45^\circ \dots (i)$$

Also, $m\angle DOM + m\angle DON = 180^\circ$... [Angles in a linear pair]

$\therefore m\angle DOM + (m\angle COD + m\angle CON) = 180^\circ$... [Angle addition property]

$\therefore 100^\circ + m\angle COD + 35^\circ = 180^\circ$

...[$\therefore m\angle DOM = 100^\circ, m\angle CON = 35^\circ$]

$\therefore m\angle COD + 135^\circ = 180^\circ$

$\therefore m\angle COD = 180^\circ - 135^\circ$

$\therefore m\angle COD = 45^\circ$... (ii)

ii. $m(\text{arc } AB) = m\angle AOB = 45^\circ$... [From (i)]

$m(\text{arc } DC) = m\angle DOC = 45^\circ$... [From (ii)]

$\therefore m(\text{arc } AB) = m(\text{arc } DC)$... [From (i) and (ii)]

$\therefore \text{arc } AB \cong \text{arc } CD$

... [If the measures of two arcs of a circle are same, then the two arcs are congruent]

iii. $\text{arc } AB \cong \text{arc } CD$

$\therefore \text{chord } AB \cong \text{chord } CD$ [The chords corresponding to congruent arcs are congruent]

Maharashtra Board Class 8 Maths Chapter 17 Circle: Chord and Arc Practice Set 17.2 Intext Questions and Activities

Question 1.

If the measures of two arcs of a circle are same, then two arcs are congruent. Verify this property using tracing paper. (Textbook pg. no. 117)

Solution:

[Students should attempt the above activities on their own.]

Question 2.

With the help of following activity find out the properties of the chord and the corresponding arc.

i. a. Draw a circle with centre O.

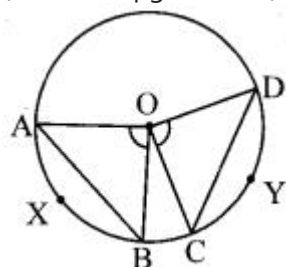
b. Draw $\angle COD$ and $\angle AOB$ of same measure.

You will find that the arc AXB and arc CYD are congruent.

c. Draw chords AB and CD.

d. Using compass experience that the length of chord AB and chord CD is also same.

(Textbook pg. no. 117)



Solution:

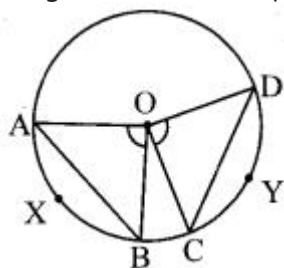
[Students should attempt the above activities on their own.]

ii. a. Draw a circle with centre C.

b. Draw the congruent chords AB and DE of the circle. Draw the radii CA, CB, CD and CE.

c. Check that $\angle ACB$ and $\angle DCE$ are congruent.

d. Hence show that measure of arc AB and arc DE is equal. Hence these arcs are congruent. (Textbook pg. no. 117)



Solution:

[Students should attempt the above activities on their own.]

Miscellaneous Exercise 2 8th Std Maths Answers

Question 1.

Questions and their alternative answers are given. Choose the correct alternative answer.

i. Find the circumference of a circle whose area is 1386 cm^2 ? [Chapter 15]

(A) 132 cm^2

(B) 132 cm

(C) 42 cm

(D) 21 cm^2

Solution:

(B) 132 cm

Hint:

i. Area of the circle = πr^2

$$1386 = 227 \times r^2$$

$$r^2 = 1386 \times 722$$

$$= 63 \times 7$$

$$= 441$$

$$r = \sqrt{441} \dots \text{[Taking square root of both sides]}$$

$$= 21 \text{ cm}$$

$$\text{Circumference of the circle} = 2\pi r$$

$$= 2 \times 227 \times 21$$

$$= 132 \text{ cm}$$

ii. The side of a cube is 4 m. If it is doubled, how many times will be the volume of the new cube, as compared with the original cube? [Chapter 16]

(A) Two times

(B) Three times

(C) Four times

(D) Eight times

Solution:

(D) Eight times

Hint:

ii. Original volume = $(4)^3 = 64$ cu.m

New side = 8 m

\therefore New volume = $(8)^3 = 512$ cu.m

Now, $\frac{\text{new volume}}{\text{original volume}} = \frac{512}{64} = 8$

original volume 64

\therefore volume of new cube will increase 8 times as compared to the volume of original cube.

Question 2.

Pranalee was practicing for a 100 m running race. She ran 100 m distance 20 times. The time required, in seconds, for each attempt was as follows. [Chapter 11]

18, 17, 17, 16, 15, 16, 15, 14, 16, 15, 15, 17, 15, 16, 15, 17, 16, 15, 14, 15

Find the mean of the time taken for running.

Solution:

Time in seconds (x_i)	Tally marks	No. of attempts (f_i)	$f_i \times x_i$
14		2	28
15		8	120
16		5	80
17		4	68
18		1	18
		N = 20	$\sum f_i x_i = 314$

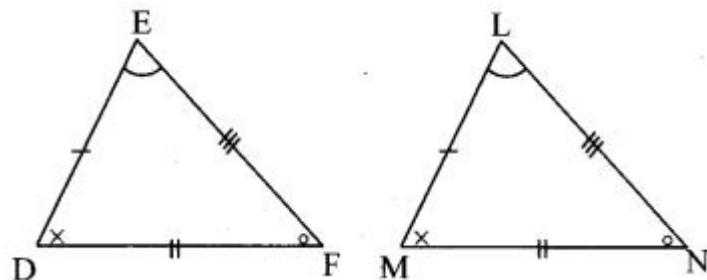
$$\text{Mean } (\bar{x}) = \frac{\sum f_i x_i}{N} = \frac{314}{20} = 15.7 \text{ seconds}$$

\therefore The mean of the time taken for running 100 m race is 15.7 seconds.

Question 3.

$\triangle DEF$ and $\triangle LMN$ are congruent in the correspondence $EDF \leftrightarrow LMN$. Write the pairs of congruent sides and congruent angles in the correspondence. [Chapter 13]

Solution:



$$\triangle EDF \cong \triangle LMN$$

$$\therefore \text{side ED} \cong \text{side LM}$$

$$\text{side DF} \cong \text{side MN}$$

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side EF \cong side LN

$\angle E \cong \angle L$

$\angle D \cong \angle M$

$\angle F \cong \angle N$

Question 4.

The cost of a machine is Rs 2,50,000. It depreciates at the rate of 4% per annum. Find the cost of the machine after three years. [Chapter 14]

Solution:

Here, P = Cost of the machine = Rs 2,50,000

R = Rate of depreciation = 4%

N = 3 Years

A = Depreciated price of the machine

$$\begin{aligned} A &= P \left[1 + \frac{R}{100} \right]^N \\ &= 2,50,000 \left[1 + \frac{(-4)}{100} \right]^3 \\ &= 2,50,000 \left[1 - \frac{4}{100} \right]^3 \\ &= 2,50,000 \left[\frac{100 - 4}{100} \right]^3 \\ &= 2,50,000 \left[\frac{96}{100} \right]^3 \\ &= 2,50,000 \left[\frac{24 \times 4}{25 \times 4} \right]^3 \\ &= 2,50,000 \left[\frac{24}{25} \right]^3 \\ &= 2,50,000 \times \frac{24}{25} \times \frac{24}{25} \times \frac{24}{25} \\ &= 16 \times 24 \times 24 \times 24 \\ &= ₹ 2,21,184 \end{aligned}$$

\therefore The cost of the machine after three years will be Rs 2,21,184.

Question 5.

In $\square ABCD$, side AB \parallel side DC, seg AE \perp seg DC. If $l(AB) = 9$ cm, $l(AE) = 10$ cm, $A(\square ABCD) = 115 \text{ cm}^2$, find $l(DC)$. [Chapter 15]

Solution:

Given, side AB \parallel side DC.

$\therefore \square ABCD$ is a trapezium.

$$\begin{aligned}
 A &= P \left[1 + \frac{R}{100} \right]^N \\
 &= 2,50,000 \left[1 + \frac{(-4)}{100} \right]^3 \\
 &= 2,50,000 \left[1 - \frac{4}{100} \right]^3 \\
 &= 2,50,000 \left[\frac{100 - 4}{100} \right]^3 \\
 &= 2,50,000 \left[\frac{96}{100} \right]^3 \\
 &= 2,50,000 \left[\frac{24 \times 4}{25 \times 4} \right]^3 \\
 &= 2,50,000 \left[\frac{24}{25} \right]^3 \\
 &= 2,50,000 \times \frac{24}{25} \times \frac{24}{25} \times \frac{24}{25} \\
 &= 16 \times 24 \times 24 \times 24 \\
 &= ₹ 2,21,184
 \end{aligned}$$

Given, $l(AB) = 9$ cm, $l(AE) = 10$ cm,

$A(\square ABCD) = 115 \text{ cm}^2$

Area of a trapezium

$= \frac{1}{2} \times \text{sum of lengths of parallel sides} \times \text{height}$

$\therefore A(\square ABCD) = \frac{1}{2} \times [l(AB) + l(DC)] \times l(AE)$

$\therefore 115 = \frac{1}{2} \times [9 + l(DC)] \times 10$

$\therefore 115 \times 2 = 9 + l(DC)$

$\therefore 23 = 9 + l(DC)$

$\therefore l(DC) = 23 - 9$

$\therefore l(DC) = 14 \text{ cm}$

Question 6.

The diameter and height of a cylindrical tank is 1.75 m and 3.2 m respectively. How much is the capacity of tank in litre?

$[\pi = 22/7]$ [Chapter 16]

Solution:

Given: For cylindrical tank:

diameter (d) = 1.75 m, height (h) = 3.2 m

To Find: Capacity of tank in litre

diameter (d) = 1.75 m

$= 1.75 \times 100$

....[$\because 1 \text{ m} = 100 \text{ cm}$]

$= 175 \text{ cm}$

$$\therefore \text{radius } (r) = \frac{d}{2} = \frac{175}{2} \text{ cm}$$

$$h = 3.2 \text{ cm}$$

$$= 3.2 \times 100$$

$$= 320 \text{ cm}$$

Capacity of tank = Volume of the cylindrical tank

$$= \pi r^2 h$$

$$= \frac{22}{7} \times \left(\frac{175}{2}\right)^2 \times 320$$

$$= \frac{22}{7} \times \frac{175}{2} \times \frac{175}{2} \times 320$$

$$= 11 \times 25 \times 175 \times 160$$

$$= 77,00,000 \text{ cc}$$

$$= \frac{7700000}{1000} \text{ litre} \quad \dots [1 \text{ litre} = 1000 \text{ cc}]$$

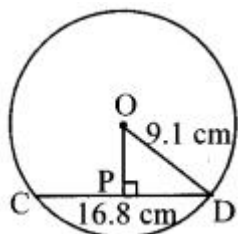
$$= 7700 \text{ litre}$$

\therefore The capacity of the tank is 7700 litre.

Question 7.

The length of a chord of a circle is 16.8 cm, radius is 9.1 cm. Find its distance from the centre. [Chapter 17]

Solution:



Let CD be the chord of the Circle with centre O.

Draw seg $OP \perp$ chord CD

$$\therefore l(PD) = \frac{1}{2} l(CD)$$

...[Perpendicular drawn from the centre of a circle to its chord bisects the chord]

$$\therefore l(PD) = \frac{1}{2} \times 16.8 \dots [l(CD) = 16.8 \text{ cm}]$$

$$\therefore l(PD) = 8.4 \text{ cm} \dots (i)$$

$$\therefore \text{In } \triangle OPD, m\angle OPD = 90^\circ$$

$$\therefore [l(OD)]^2 = [l(OP)]^2 + [l(PD)]^2 \dots \dots [\text{Pythagoras theorem}]$$

$$\therefore (9.1)^2 = [l(OP)]^2 + (8.4)^2 \dots [\text{From (i) and } l(OD) = 9.1 \text{ cm}]$$

$$\therefore (9.1)^2 - (8.4)^2 = [l(OP)]^2$$

$$\therefore (9.1 + 8.4)(9.1 - 8.4) = [l(OP)]^2$$

$$\dots [a^2 - b^2 = (a + b)(a - b)]$$

$$\therefore 17.5 \times 0.7 = [l(OP)]^2$$

$$\therefore 12.25 = [l(OP)]^2$$

$$\text{i.e., } [l(OP)]^2 = 12.25$$

$$\therefore l(OP) = \sqrt{12.25}$$

...[Taking square root of both sides]

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$\therefore l(OP) = 3.5 \text{ cm}$

\therefore The distance of the chord from the centre is 3.5 cm.

Question 8.

The following tables shows the number of male and female workers, under employment guarantee scheme, in villages A, B, C and D.

Villages	A	B	C	D
No. of females	150	240	90	140
No. of males	225	160	210	110

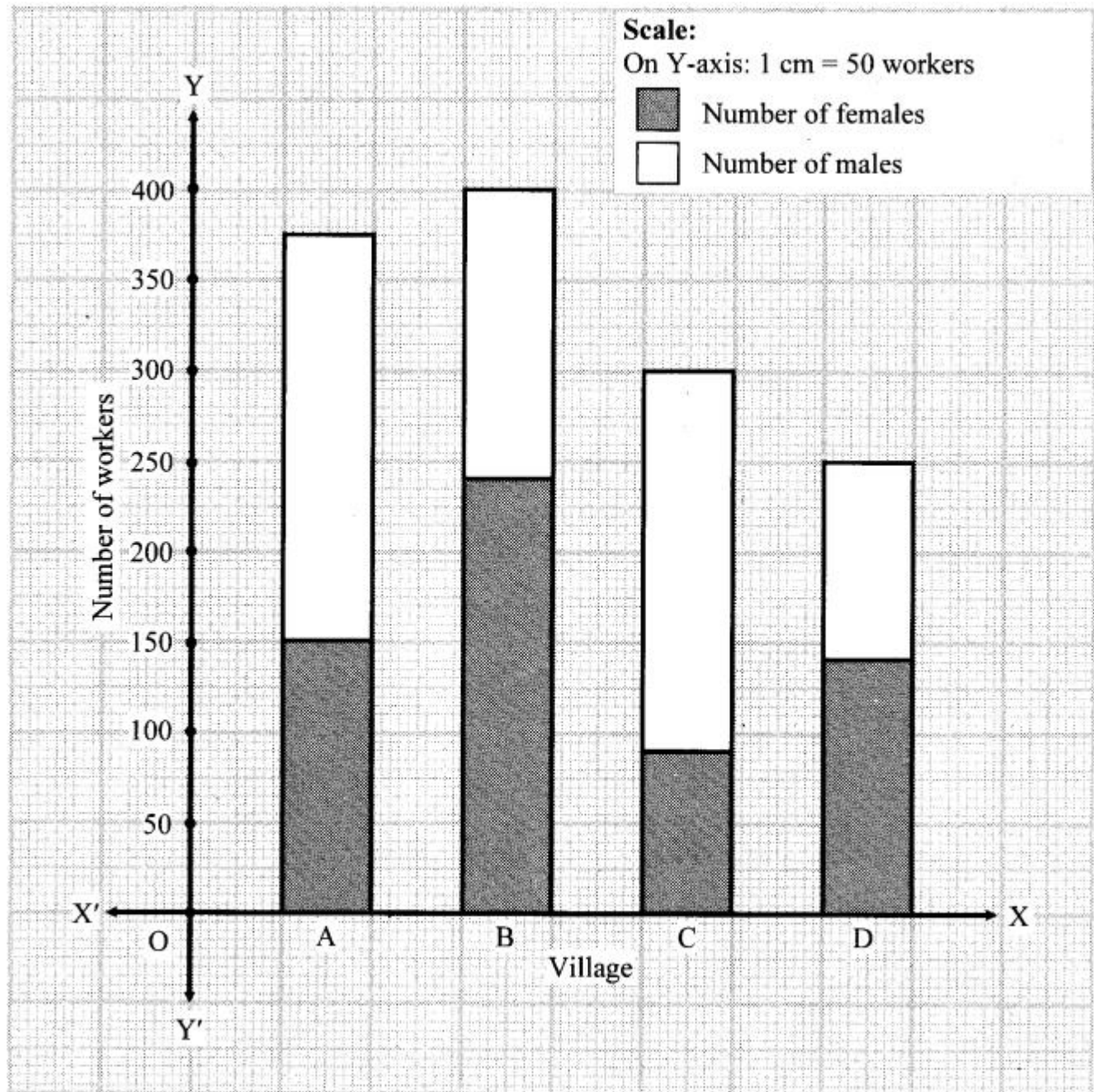
i. Show the information by a sub-divided bar-diagram.

ii. Show the information by a percentage bar diagram. [Chapter 11]

Solution:

i.

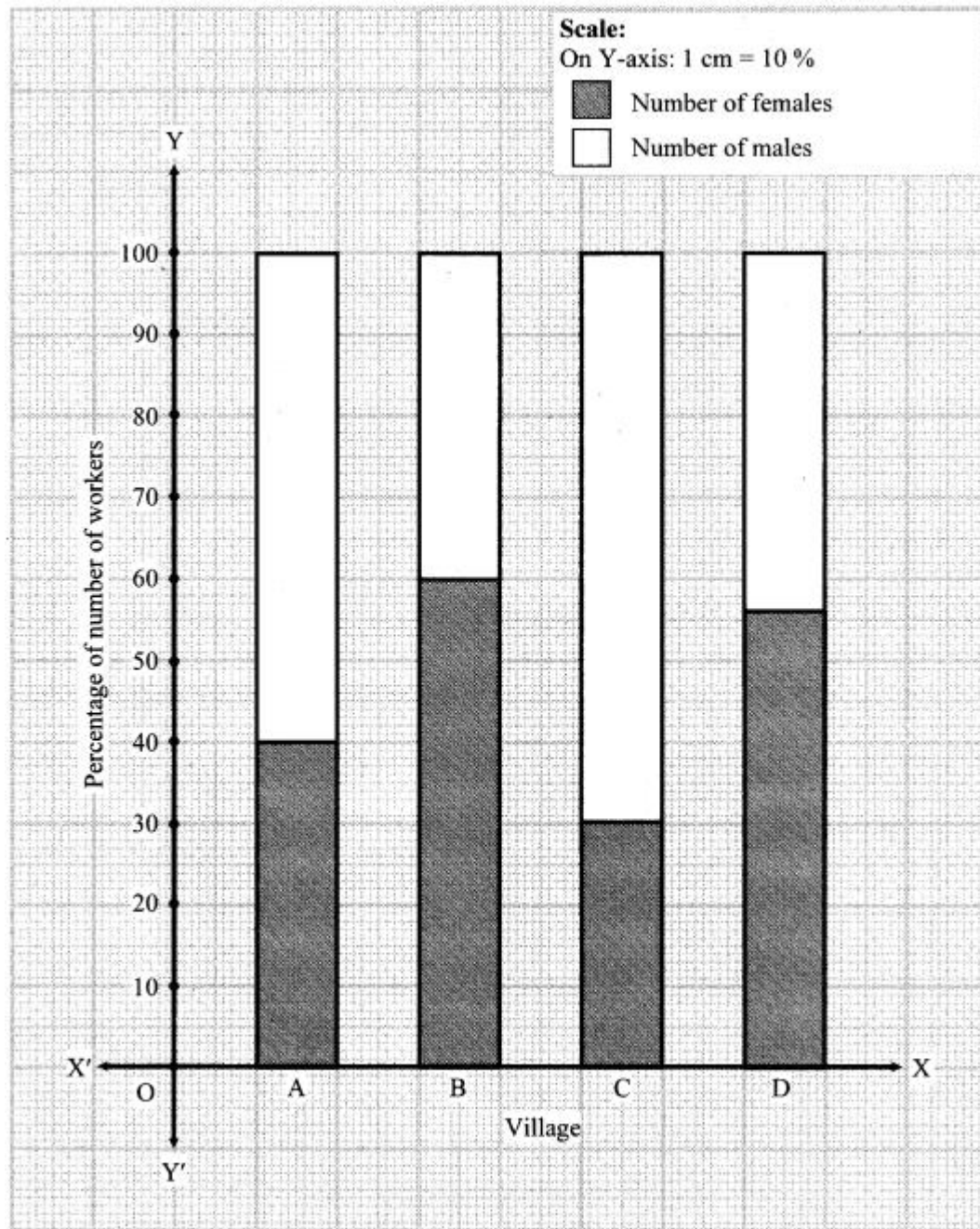
Villages	A	B	C	D
No. of females	150	240	90	140
No. of males	225	160	210	110
Total	375	400	300	250



ii.

Villages	A	B	C	D
No. of females	150	240	90	140
No. of males	225	160	210	110
Total	375	400	300	250
Percentage of females	40%	60%	30%	56%

Percentage of males	60%	40%	70%	44%
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Question 9.

Solve the following equations.

i. $17(x + 4) + 8(x + 6) = 11(x + 5) + 15(x + 3)$

ii. $3y^2 + y + 44 = 5 - y - 24$

iii. $5(1 - 2x) = 9(1 - x)$

[Chapter 12]

Solution:

i. $17(x + 4) + 8(x + 6) = 11(x + 5) + 15(x + 3)$

$\therefore 17x + 68 + 8x + 48 = 11x + 55 + 15x + 45$

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$$\therefore 17x + 8x + 68 + 48 = 11x + 15x + 55 + 45$$

$$\therefore 25x + 116 = 26x + 100$$

$$\therefore 25x + 116 - 116 = 26x + 100 - 116$$

... [Subtracting 116 from both the sides]

$$\therefore 25x = 26x - 16$$

$$\therefore 25x - 26x = 26x - 16 - 26x$$

... [Subtracting 26x from both the sides]

$$\therefore -x = -16$$

$$\therefore -x - 1 = -16 - 1$$

$$\therefore x = 16$$

$$\text{ii. } 3y + 2 + y + 4 = 5 - y - 2$$

$$\therefore 3y + 2 + y + 4 = 5 - y - 2$$

$$\therefore 6y + 6 = 5 - y - 2$$

$$\therefore 6y + 6 + y + 2 = 5 - y - 2 + y + 2$$

.....[Multiplying both the sides by 4]

$$\therefore 6y + y + 4 = 20 - (y - 2)$$

$$\therefore 7y + 4 = 20 - y + 2$$

$$\therefore 7y + 4 = 22 - y$$

$$\therefore 7y + 4 - 4 = 22 - y - 4$$

.....[Subtracting 4 from both the sides]

$$\therefore 7y = 18 - y$$

$$\therefore 7y + y = 18 - y + y$$

...[Adding y on both the sides]

$$\therefore 8y = 18$$

$$\therefore 8y = 18 \dots \text{[Dividing both the sides by 8]}$$

$$\therefore y = \frac{9}{4}$$

$$\text{iii. } 5(1 - 2x) = 9(1 - x)$$

$$\therefore 5 - 10x = 9 - 9x$$

$$\therefore 5 - 10x - 5 = 9 - 9x - 5$$

....[Subtracting 5 from both the sides]

$$\therefore -10x = 4 - 9x$$

$$\therefore -10x + 9x = 4 - 9x + 9x$$

... [Adding 9x on both the sides]

$$\therefore -x = 4$$

$$\therefore -x \times (-1) = 4 \times (-1)$$

... [Multiplying both the sides by -1]

$$\therefore x = -4$$

Question 10.

Complete the activity according to the given steps.

i. Draw rhombus ABCD. Draw diagonal AC.

ii. Show the congruent parts in the figure by identical marks.

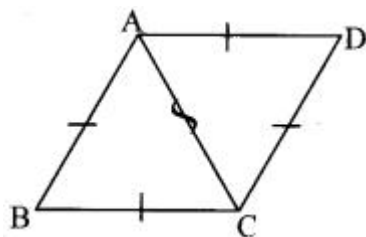
iii. State by which, test and in which correspondence $\triangle ADC$ and $\triangle ABC$ are congruent.

iv. Give reason to show $\angle DCA \cong \angle BCA$, and $\angle DAC \cong \angle BAC$

v. State which property of a rhombus is revealed from the above steps. [Chapter 13]

Solution:

a.



b. In $\triangle ADC$ and $\triangle ABC$,

side $AD \cong$ side AB [Sides of a rhombus]

side $DC \cong$ side BC [Sides of a rhombus]

side $AC \cong$ side AC ... [Common side]

$\triangle ADC \cong \triangle ABC$... [By SSS test]

$\angle DCA \cong \angle BCA$...[Corresponding angles of congruent triangles]

$\angle DAC \cong \angle BAC$...[Corresponding angles of congruent triangles]

From the above steps, property of rhombus revealed is 'diagonal of a rhombus bisect the opposite angles'.

Question 11.

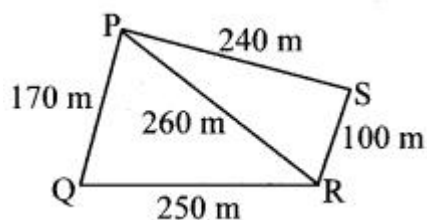
The shape of a farm is a quadrilateral. Measurements taken of the farm, by naming its

corners as P, Q, R, S in order are as follows. $l(PQ) = 170$ m,

$l(QR) = 250$ m, $l(RS) = 100$ m, $l(PS) = 240$ m, $l(PR) = 260$ m.

Find the area of the field in hectare (1 hectare = 10,000 sq.m). [Chapter 15]

Solution:



Area of the field = $A(\triangle PQR) + A(\triangle PSR)$

In $\triangle PQR$, $a = 170$ m, $b = 250$ m, $c = 260$ m

Semiperimeter of $\triangle PQR = s$

$$= \frac{1}{2}(a + b + c)$$

$$= \frac{1}{2}(170 + 250 + 260)$$

$$= \frac{1}{2} \times 680 = 340$$

$$\therefore A(\Delta PQR) = \sqrt{s(s-a)(s-b)(s-c)}$$

$$= \sqrt{340(340-170)(340-250)(340-260)}$$

$$= \sqrt{340 \times 170 \times 90 \times 80}$$

$$= \sqrt{2 \times 170 \times 170 \times 3 \times 3 \times 10 \times 2 \times 2 \times 2 \times 10}$$

$$= \sqrt{2^2 \times 2^2 \times 3^2 \times 10^2 \times 170^2}$$

$$= 2 \times 2 \times 3 \times 10 \times 170$$

$$= 20400 \text{ sq.m}$$

In ΔPSR , $a = 240$ m, $b = 100$ m, $c = 260$ m

Semiperimeter of $\Delta PSR = s$

$$= \frac{1}{2}(240 + 100 + 260)$$

$$= \frac{1}{2} \times 600$$

$$= 300$$

$$\therefore A(\Delta PSR)$$

$$= \sqrt{300(300-240)(300-100)(300-260)}$$

$$= \sqrt{300 \times 60 \times 200 \times 40}$$

$$= \sqrt{5 \times 60 \times 60 \times 5 \times 40 \times 40}$$

$$= \sqrt{5^2 \times 40^2 \times 60^2}$$

$$= 5 \times 40 \times 60$$

$$= 12000 \text{ sq.m}$$

Area of the field = $A(\Delta PQR) + A(\Delta PSR)$

$$= 20400 + 12000$$

$$= 32400 \text{ sq.m}$$

$$= 32400/10000$$

...[1 hectare = 10,000 sq.m]

$$= 3.24 \text{ hectares}$$

\therefore The area of the field is 3.24 hectares.

Question 12.

In a library, 50% of total number of books is of Marathi. The books of English are 13 of

Marathi books. The books on Mathematics are 25% of the English books. The remaining 560 books are of other subjects. What is the total number of books in the library?

[Chapter 12]

Solution:

Let the total number of books in the library be x

50% of total number of books is of Marathi.

Number of Marathi books = 50% of x

$$= \frac{50}{100} \times x$$

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

The books of English are $\frac{1}{3}$ of Marathi books.

Number of books of English = $\frac{1}{3} \times \frac{x}{2}$

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

The books on Mathematics are 25% of the English books.

Number of books of Mathematics

= 25% of $\frac{x}{6}$

$$= \frac{25}{100} \times \frac{x}{6}$$

$$= \frac{x}{24}$$

Since, there are 560 books of other subjects, the total number of books in the library are

$$x = \frac{x}{2} + \frac{x}{6} + \frac{x}{24} + 560$$

$$\therefore x = \frac{x \times 12}{2 \times 12} + \frac{x \times 4}{6 \times 4} + \frac{x}{24} + 560$$

$$\therefore x = \frac{12x}{24} + \frac{4x}{24} + \frac{x}{24} + 560$$

$$\therefore x = \frac{12x + 4x + x}{24} + 560$$

$$\therefore x = \frac{17x}{24} + 560$$

$$\therefore x \times 24 = \frac{17x}{24} \times 24 + 560 \times 24$$

$$\therefore 24x = 17x + 13440$$

$$\therefore 24x - 17x = 17x + 13440 - 17x$$

$$\therefore 7x = 13440$$

$$\therefore 7 \times 7 = 13440 \div 7$$

$$\therefore x = 1920$$

\therefore The total number of books in the library are 1920.

Question 13.

Divide the polynomial $(6x^3 + 11x^2 - 10x - 7)$ by the binomial $(2x + 1)$. Write the quotient and the remainder. [Chapter 10]

Solution:

$$(6x^3 + 11x^2 - 10x - 7) \div (2x + 1)$$

$$\begin{array}{r} 3x^2 + 4x - 7 \\ 2x+1 \overline{) 6x^3 + 11x^2 - 10x - 7} \\ \underline{6x^3 + 3x^2} \\ 0 + 8x^2 - 10x - 7 \\ \underline{8x^2 + 4x} \\ 0 - 14x - 7 \\ \underline{- 14x - 7} \\ 0 \end{array}$$

\therefore Quotient = $3x^2 + 4x - 7$,

remainder = 0

Explanation:

i. $(2x + 1) \times \boxed{3x^2} = 6x^3 + 3x^2$

ii. $(2x + 1) \times \boxed{4x} = 8x^2 + 4x$

iii. $(2x + 1) \times \boxed{-7} = -14x - 7$

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