MATHS

BOOKS - MTG IIT JEE FOUNDATION

PRACTICAL GEOMETRY

Illustrations

1. Draw two concentric circles of radius 3.5 cm and 5 cm. Label point P in exterior of bigger circle and smaller circle.

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2. Draw a line segment of measure 6.8 cm using ruler.

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3. Construct $\overline{AB}$ of length 5.6 cm. From A cut off $\overline{AC}$ as 2.3 cm. Now measure $\overline{BC}$ with ruler.

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4. Draw a line segment PQ of length 10 cm. Take a point R on it at a distance 4 cm from P. Draw a line perpendicular to $\overline{PQ}$ through R. Also find $\overline{PQ}$.

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5. Construct perpendicular bisector of a line segment of length 4.2 cm.

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6. Draw any line 'l'. Now take any point P not lying on it. Construct a line perpendicular to l and passing through point P using ruler and compasses.

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7. Construct an angle of 105° using pair of compasses.

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Solved Examples

1. Draw circular shape using a bangle and mark any point P in its interior and Q is its exterior.

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2. Draw a line segment $AB = 2.2$ cm using ruler and compoasses. Draw $\overline{PQ}$ such that length of $\overline{PQ}$ is thrice of $\overline{AB}$.

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3. Given two line segments AB and CD with measure 4.2 cm . Now draw a line segment of length equal to sum of line segment AB and CD.

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4. Find mid point of a line segment of length 6.8 cm.

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5. Draw a circle of any radius with diamtter AB. Draw perpendicular bisector XY of AB. What do you call the point where XY meets AB ?

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6. Draw a line segment PQ = 8 cm. Using ruler and compass, obtain a line segment of length $\frac{3}{4}$(PQ).

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7. Draw $\angle XYZ = 80^\circ$ and divide it in four equal parts. What will be the measure of each angle ?

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8. Draw an angle of 135° using ruler and compasses.

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Ncert Section Exercise 14 1

1. Draw a circle of radius 3.2 cm .

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2. With the same centre O, draw two circles of radii 4 cm and 2.5 cm.

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3. Draw a circle and any two of its diameters. If you join the ends of these diameters, what is

the figure obtained ? What figure is obtained if the diameters are perpendicular to each other ? How do you check you answer ?

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4. Draw any circle and mark points A such that A is on the circle.

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5. Draw any circle and mark points B such that

B is in the interior of the circle

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6. Draw any circle and mark points C such that

C is in the exterior of the circle.

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7. Let A, B the centres of two circles of equal radii, draw them so that ecah one of them passes through the centre of the other. Let them intersect at C and D. Examine whether $\overline{AB}$ and $\overline{CD}$ are at right angles.

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Ncert Section Exercise 14 2

1. Draw a line segment of length 7.3 cm using a ruler.

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2. Construct a line segment of length 5.6 cm ruler and compasses.

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3. Construct $\overline{AB}$ of length 7.8 cm. From this, cut off $\overline{AC}$ of length 4.7 cm. Measure $\overline{BC}$.

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4. Given $\overline{AB}$ of length 3.9 cm, construct $\overline{PQ}$ such that the length of $\overline{PQ}$ is twice that of $\overline{AB}$. Verify by measurement .

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5. Given $\overline{AB}$ of length 7.3 cm and $\overline{CD}$ of length 3.4 cm, construct a line segment $\overline{XY}$ such that the length of $\overline{XY}$ is equal to the difference beetween the lengths of $\overline{AB}$ and $\overline{CD}$. Verify by measurement.

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Ncert Section Exercise 14 3

1. Draw any line segment $\overline{PQ}$. without measuring $\overline{PQ}$ construct a copy of $\overline{PQ}$.

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2. Given some line segmet $\overline{AB}$, whose length you do know, construct $\overline{PQ}$ such that the length of $\overline{PQ}$ is twice that of $\overline{AB}$.

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Ncert Section Exercise 14 4

1. Draw any line segment $\overline{AB}$. Mark any point M on it. Through M, draw a perpendicular to $\overline{AB}$. (use ruler and compasses)

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2. Draw any line segment $\overline{PQ}$. Take any point R not on it. Through R, draw a perpendicular to $\overline{PQ}$ (use ruler and set-square)

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3. Draw a line l and a point X on it. Through X, draw a line segment $\overline{XY}$ perpendicular to l. Now draw a perpendicular to $\overline{XY}$. at Y. (use ruler and compasses)

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Ncert Section Exercise 14 5

1. Draw $\overline{AV}$ of length 7.3 cm and find its axis of symmetry.

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2. Draw a line segment of length 9.5 cm and construct its perpendicular bisector.

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3. Draw the perpendicular bisector of $\overline{XY}$ whose length is 10.3 cm.

Take any point P on the bisector drawn. Examine whether PX = PY.

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4. Draw the perpendicular bisector of $\overline{XY}$ whose length is 10.3 cm.

If M is the mid point of $\overline{XY}$ what can you say about the lengths MX and XY ?

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5. Draw a line segment of length 12.8 cm . Using compasses, divide it into four equal parts. Verify by actual measurement.

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6. With PQ of length 6.1 cm as diameter, draw a circle.

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7. Draw a circle with centre C and radis 3.4 cm . Draw any chord $\overline{AB}$. Construct the perpendicular bisector of $\overline{AB}$. and examine if it passes through C.

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8. Draw a line segment XY as the diameter of a circle .

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9. Draw a circle of radius4 cm Draw any two of its chords. Construct the perpendicular bisectors of these chords. Where do they meet ?

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10. Draw any angle with vertex O Take a point A on one of its arms and B on another such that OA = OB. Draw the perpendicular bisectors of $\overline{OA}$ and $\overline{OB}$. Let them meet at P. Is PA = PB ?

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Ncert Section Exercise 14 6

1. Draw $\angle POQ$ of measure 75° and find its line of symmetry.

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2. Draw an angle of measure 147° and construct its bisector.

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3. Draw a right angle and construct its bisector.

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4. Draw an angle of measure 153° and divide it info four equal parts.

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5. Construct with ruler and compasses, angle of measure:

60°

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6. Construct with ruler and compasses, angle of measure:

30°

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7. Construct with ruler and compasses, angle of measure:

90°

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8. Construct with ruler and compasses, angle of measure:

120°

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9. Construct with ruler and compasses, angle of measure:

45°

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10. Construct with ruler and compasses, angle of measure:

135°

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11. Draw an angle of measure 45° and bisect it.

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12. Draw an angle of measure 135° and bisect it.

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13. Draw an angle of 70°. Make a copy of it using only a straight edge compasses.

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14. Draw an angle of 40°. Copy its supplementary angle.

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Exercise Multiple Choice Questions Level 1

1. If two line segments cut each other at right angles then they are ____.

A. Parallel

B. Perpendicular

C. Both (a) and (b)

D. None of these

Answer: B

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2. _____ is used to draw and measure an angle.

A. Protractor

B. Ruler

C. Compasses

D. None of these

Answer: A

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3. The instrument in the geometry box having the shape of a triangle is called a

A. Divider

B. Ruler

C. Pair of compasses

D. Set squares

Answer: D

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4. Which is used to draw line segments and to measure their lengths ?

A. Set squares

B. Protractor

C. Ruler

D. None of these

Answer: C

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5. If we bisect an angle of a rectangle, we get 2 angles each of _____

A. 45°

B. 30°

C. 60°

D. 15°

Answer: A

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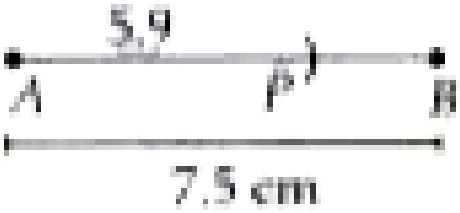
6. AB is of length 7.5 cm. From A an arc of 5.9 cm is cut off. Find measure PB .



A. $1.4cm$

B. $1.6cm$

C. $2.5cm$

D. $1.8cm$

Answer: B

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7. If we bisect $\overline{PQ} = 8cm$, then what will be length of each part ?

A. 4 cm

B. 3.2 cm

C. 2 cm

D. None of these

Answer: A

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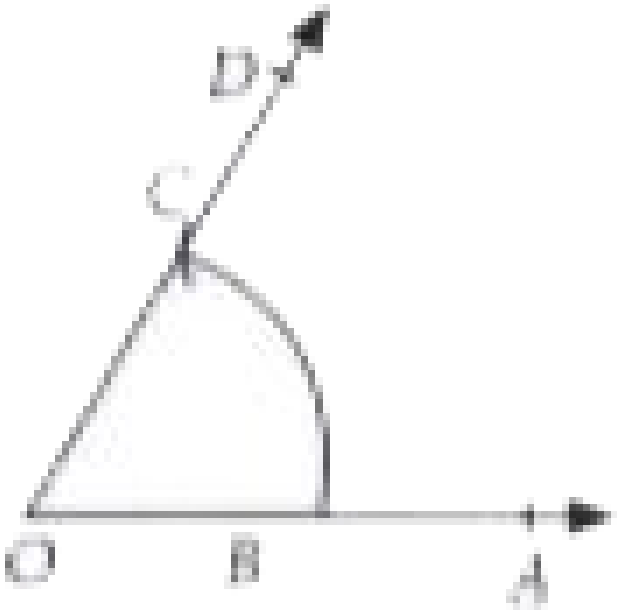
8. Given figure shown an angle of _____



A. 90°

B. 45°

C. 60°

D. 120°

Answer: C

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9. Concentric circles have different radii but same ____

A. Centre

B. Chord

C. Diamater

D. None of these

Answer: A

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10. Bisector of a line segment means dividing a line segment _____

A. In two unequal halves.

B. In ratio 1:2.

C. In two equal halves.

D. None of these

Answer: C

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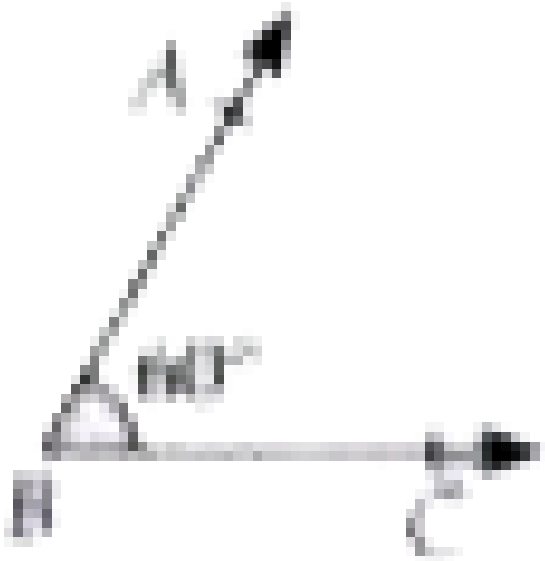
11. Given $\angle ABC = 60^\circ$. If we divide it inot four equal angles then measure of each angle

would be ___.



A. 20°

B. 40°

C. 60°

D. 15°

Answer: D

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12. Angle bisector of given angle can be constructed accurately using _____

A. Pair of compasses

B. Ruler

C. Set squares

D. Divider

Answer: A

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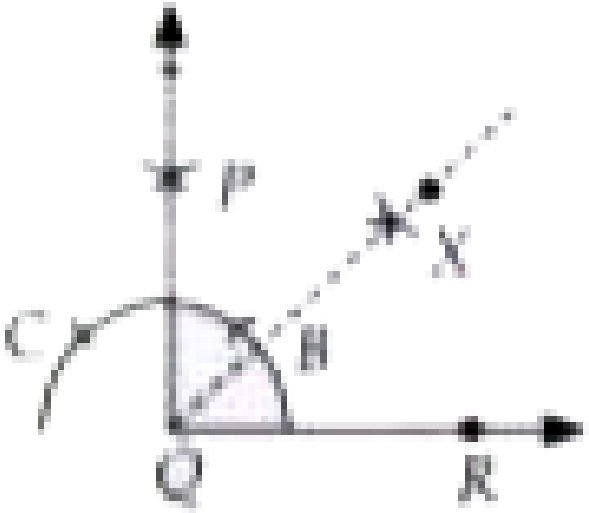
13. Measure of $\angle XQR$ equals ____.



A. 30°

B. 90°

C. 15°

D. 45°

Answer: D

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14. Which of the following is the most accureate method to copy a given line segment ?

A. Trace method

B. Ruler and compasses

C. Protractor

D. Divider only

Answer: B

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15. Two lines are said to be perpendicular if angle between them is _____

A. 90°

B. 45°

C. 30°

D. None of these

Answer: A

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16. The instrument used to draw a circle of given radius is _____

A. Compasses

B. Divider

C. Ruler

D. Set squares

Answer: A

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17. The measures of 3 diffferent angles of one of the set squares are _____.

A. $90^\circ - 45^\circ - 30^\circ$

B. $30^\circ - 90^\circ - 60^\circ$

C. $70^\circ - 50^\circ - 60^\circ$

D. None of these

Answer: B

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18. A straight angle can be bisected in ____ right angles .

A. 1

B. 3

C. 2

D. 4

Answer: C

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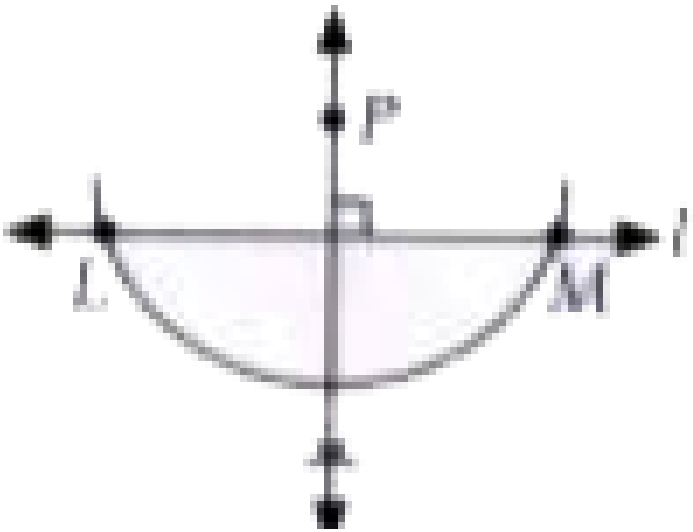
19. Figure shows construction of ___ to line l.



A. Perpendicular

B. Bisector

C. Both (a) and (b)

D. None of these

Answer: A

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20. A $\overline{AB}$ is 10.2 cm long. If P is the mid point of AB, then the length of $\overline{PB}$ is ____

A. 4.8 cm

B. 8.2 cm

C. 5.1 cm

D. 5.2 cm

Answer: B

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21. If $\overline{BX}$ bisects $\angle ABC$ of measure 75°, what will be the measure of $\angle ABX$?

A. 75°

B. $\left(37\frac{1}{2}\right)^\circ$

C. 150°

D. $\left(25\frac{1}{2}\right)^\circ$

Answer: B

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22. What angle would you get if you bisect an angle of an equilateral triangle ?

A. 60°

B. 30°

C. 90°

D. 45°

Answer: B

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23. Name the geometrical instrument having a pair of pointers.

A. Set squares

B. Divider

C. Protractor

D. Compasses

Answer: B

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24. A _____ is a simple closed curve, all of whose points are at the same distance from a fixed point.

A. Diameter

B. Radius

C. Triangle

D. Circle

Answer: D

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25. If we bisect an angle of a square, we get two angles of measure

A. less than 45°

B. $60^\circ, 30^\circ$

C. $45^\circ, 45^\circ$

D. $75^\circ, 15^\circ$

Answer: C

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26. Following are steps while constructing a line segment of length 5 cm using ruler. Which of the following steps is incorrect?

Step-1: First mark a point A on paper.

Step-2: Place a ruler in such a way that its zero point coincide with point A.

Step-3 : Draw a line from the point A of the measure of 4.5 cm on the ruler.

Step-4: Now, name the end point as Q.

Step-5: AB is the required line segment.

A. Step-1

B. Step-3

C. Step-3 and Step-4

D. None of these

Answer: C

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27. Arrange the following steps to construct an angle of 120°

Step-1 : Again, with C as centre, without changing the radius, draw one more arc. Both arcs intersect at D.

Step-2 : Draw a ray OD with O as initial point through the point D. Now, measure of $\angle DOA = 120^\circ$

. Step-3: Draw a ray OA.

Step-4 : Now, without changing the radius, keeping B as centre, draw an arc. Both the arcs intersect at a point C.

Step-5: With O as centre, draw an arc cutting OA at B.

A. $3 \rightarrow 4 \rightarrow 5 \rightarrow 1 \rightarrow 2$

B. $3 \rightarrow 5 \rightarrow 4 \rightarrow 1 \rightarrow 2$

C. $3 \rightarrow 4 \rightarrow 5 \rightarrow 2 \rightarrow 1$

D. $2 \rightarrow 1 \rightarrow 4 \rightarrow 5 \rightarrow 3$

Answer: B

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28. Arrange the following steps to construct perpendicular bisector of line segment AB.

Step-1 : With the same radius and with B as centre, draw another circle using compasses, which cuts the previous circle at X and Y.

Step-2: Join $\overline{XY}$. Now $\overline{XY}$ is the required perpendicular bisector of $\overline{AB}$.

Step-3: Draw $\overline{AB}$ of any length.

Step-4: With A as centre, using compasses, draw a circle. The radius of the circle should be more than half the length of $\overline{AB}$.

A. $2 \rightarrow 1 \rightarrow 4 \rightarrow 3$

B. $1 \rightarrow 4 \rightarrow 2 \rightarrow 3$

C. $1 \rightarrow 4 \rightarrow 3 \rightarrow 2$

D. $3 \rightarrow 4 \rightarrow 1 \rightarrow 2$

Answer: D

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29. Following are the steps while constructing a perpendicular to a line 'l' through a point 'P' not on it. Out of these one of the steps is

incorrect. Select the incorrect step.

Step-1: Given a line l and a point P not on it.

Step-2 : With P as centre, draw an arc which intersects line l at two points L and M.

Step-3 : With any convenient radius and with L and Mas centres, construct two arcs that intersect at a point, say Q, on the other side.

Step-4 : Join PQ.

A. Step-1

B. Step-2

C. Step-3

D. Step-4

Answer: C

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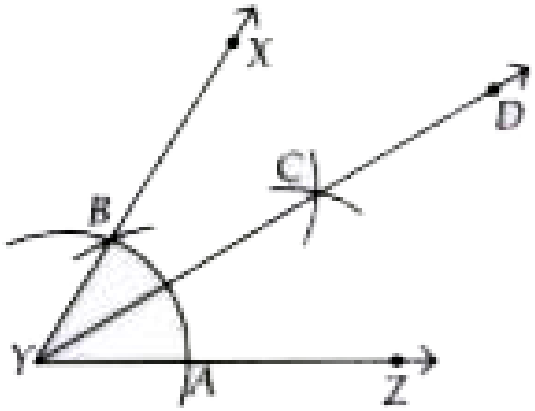
30. If YA = AB, then measure of $\angle XYC$ equals



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Exercise Multiple Choice Questions Level 2

1. To draw a peprendicular bisecto of a line segment AB, first draw a circle by taking ____ as centre and radius ___ AB.

A. A, less then half

B. Mid-point of AB equal

C. B, less then half

D. A or B, more than half

Answer: D

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2. Which of the following angles cannot be made using a ruler and a pair of compasses ?

A. 105°

B. 75°

C. 130°

D. 15°

Answer: C

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3. When you bisect an obtuse angle, it divides the angle in two ____

A. Acute angles

B. Obtuse angles

C. Right angles

D. None of these

Answer: A

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4. How many peprndiculars can be drawn to a given line passing through given point not lying on it ?

A. 0

B. 1

C. 2

D. infinite

Answer: B

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5. Perpendicular bisector of a line segment divides that line in _____ at an angle of _____

A. Two equal halves, 45°

B. Two equal halves, 90°

C. $1:2$, 90°

D. $1:2$, 45°

Answer: B

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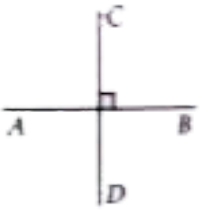
Exercise Matching

1. Match the following

List-I		List-II
(P) Bisecting given angle	1.	

(Q) Perpendicular lines 2. 

(R) Bisecting given line segment $\overline{AB}$ 3. 

(S) Concentric circles 4. 

A. $P-2, Q-1, R-4, S-3$

B. $P-4, Q-1, R-2, S-3$

C. $P-1, Q-2, R-3, S-4$

D. $P-1, Q-4, R-2, S-3$

Answer: D

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Exercise Assertion Reason Type

1. Assertion : To construct an angle of 45° we first draw angle of 90° and then bisect it using ruler and pair of compasses.

Reason : 45° is multiple of angle of 15°. So, it can be drawn using ruler and pair of compasses.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: B

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2. Assertion : Line segment of length 5 cm can be constructed using ruler only.

Reason : We can construct any line segment using ruler.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: D

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Exercise Subjective Problems Very Short Answer Type

1. With the help of a ruler construct line segment AB of length

6.4 cm

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2. With the help of a ruler construct line segment AB of length

7.8 cm

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3. Draw circle of radius 3.7 cm .

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4. With O as a same centre, draw two circles of radii 3 cm and 5 cm.

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5. If AB = 4.8 cm and CD = 2.8 cm, construct a line segment whose length is AB-CD.

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6. If P is the mid point of line segment AB , then what is the relation between AP an PB ?

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Exercise Subjective Problems Short Answer Type

1. Construct a line segment AB = 8.9 cm. Construct another segment AC such that C lies

on AB and AC = 3.8 cm. Measure the length of the remaining line segment.

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2. Draw an angle of measure 155° and divide it into four equal parts.

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3. Draw a line segment PQ of length 5.4 cm. Take a point R on it such that PR = 2.4 cm. Now

draw a perpendicular to PQ passing through R.

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4. Draw a circle taking line segment of length 4.4 cm as its diameter.

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5. Construct $\angle AOB = 90^\circ$ with help of ruler and compasses , draw a ray bisecting $\angle AOB$.

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Exercise Subjective Problems Long Answer Type

1. Draw angle of 67.5° using compasses.

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2. Divide the line segment of length 8.4 cm into four equal parts using compasses.

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3. Draw line segments AB and CD of lengths 5.5 cm and 2.5 cm respectively. Construct a segment whose length equals $3\overline{AB} - 4\overline{CD}$.

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4. Draw perpendicular bisector of line segment AB = 7.5 cm.

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5. Bisect a straight angle, using ruler and compasses. Measure each part.

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