

NCERT QUESTIONS WITH SOLUTIONS

FIGURE IT OUT

8.1 ARTWORK

★ Construct

1. A person

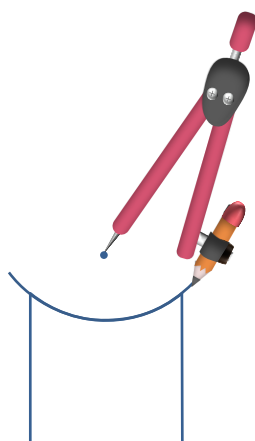
How will you draw this?



This figure has two components.



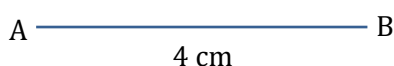
You might have figured out a way of drawing the first part. For drawing the second part, see this.



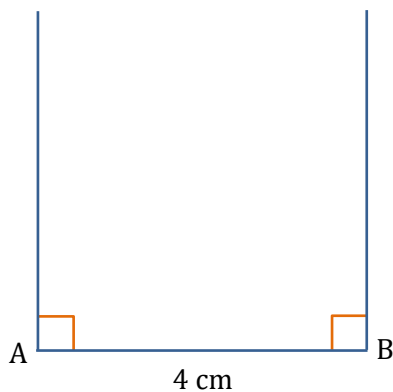
The challenge here is to find out where to place the tip of the compass and the radius to be taken for drawing this curve. You can fix a radius in the compass and try placing the tip of the compass in different locations to see which point works for getting the curve. Use your Estimate where to keep the tip.

Construction steps:

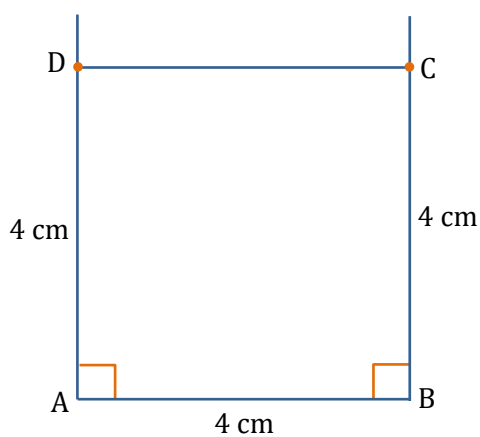
(i) Draw a line segment $AB = 4$ cm.



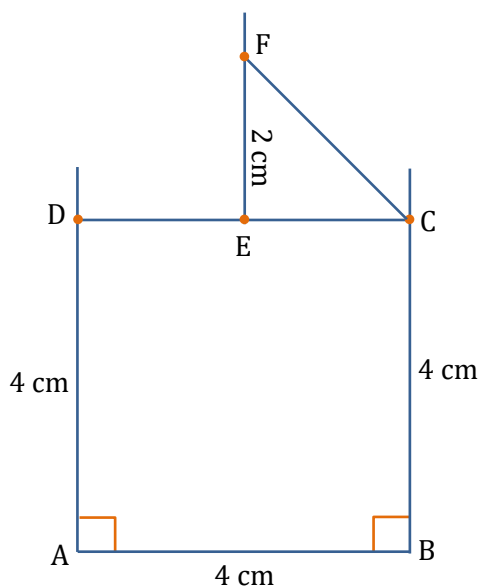
(ii) At A and B, draw perpendicular with the help of protractor.



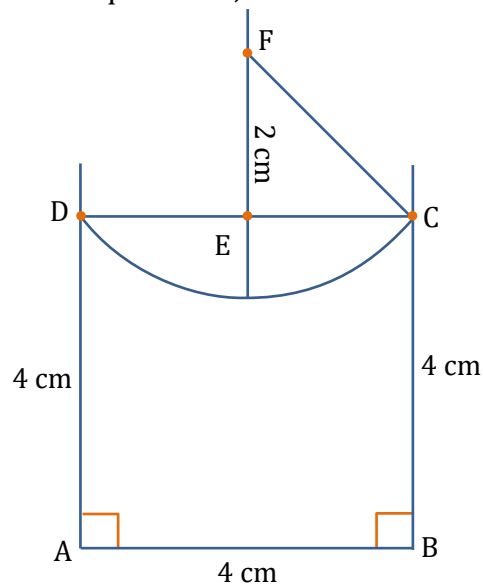
(iii) Mark point D on perpendicular at A and B on the perpendicular at B such that $AD = BC = 4$ cm. Join DC.



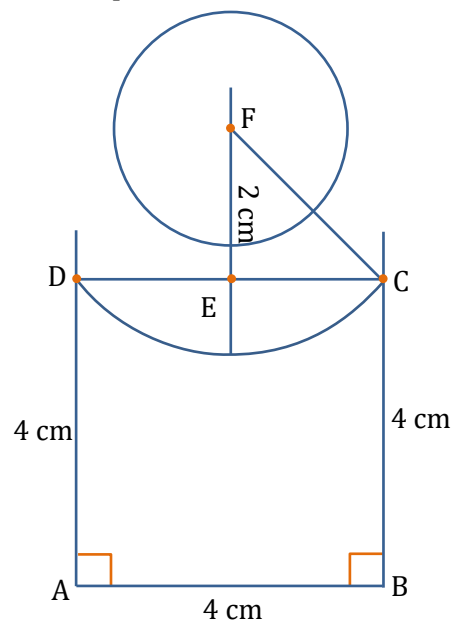
(iv) Mark a point E on DC such that $DE = EC = 2$ cm. Draw a perpendicular at point E. Mark a point F on the perpendicular such that $EF = 3$ cm. Join FC.



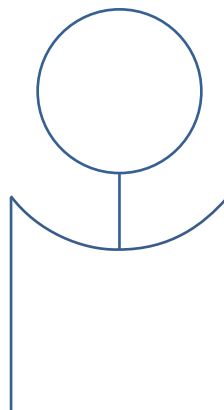
- (v) With F as centre as radius equal to FC, draw an arc from C to D. Extend FE to the arc.



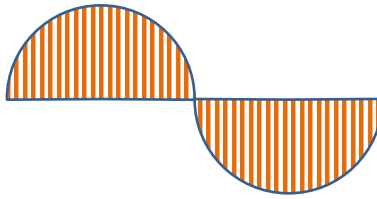
- (vi) With F as centre and radius equal to 1.5 cm draw a circle.



- (vii) Erase all the extra lines from the above drawn figure. The resultant figure represents the required person.



2. Wavy Wave method



Step-by-Step Construction:

- (i) Draw the Central Line:

Draw a straight horizontal line of length 8 cm. Label the endpoints as A and B. This is your central line AB.

$AB = 8 \text{ cm}$.

- (ii) Find the Midpoint of AB:

Using the ruler, find the midpoint of line AB. Since $AB = 8 \text{ cm}$, the midpoint will be at 4 cm from either endpoint A or B. Label this point as O.

- (iii) Set the Radius of the Compass:

Set the radius of your compass to 2 cm. This radius is equal to one-fourth of the length of AB (since we are drawing a half-circle).

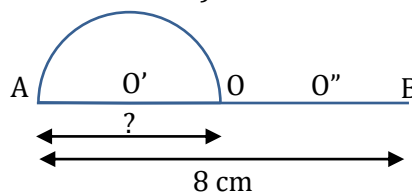
- (iv) Draw the First Half Circle Above AB:

Place the compass pointer at the midpoint O'.

With the compass set to a radius of 2 cm, draw a half circle above the central line AB. The half-circle should pass through both points A and O'. This forms the first wave.

- (v) Draw the Second Half Circle Below AB:

If you need to continue the wave, draw a second half-circle below the line AB. Place the compass pointer at O'', keeping the radius at 2 cm, and draw the half-circle in the opposite direction (below the line AB).



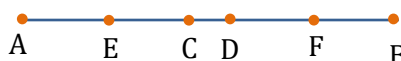
3. Steps to Draw an Eye Using Only a Compass:



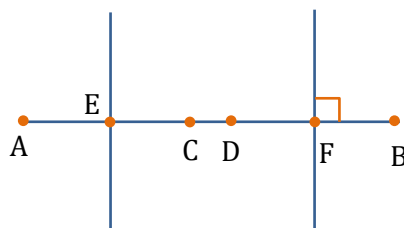
Step 1: Take a line AB of length 8.5 cm ($4 \text{ cm} + 0.5 \text{ cm} + 4 \text{ cm}$) as base. Take points C and D on AB such that $AC = 4 \text{ cm}$ and $AD = 4.5 \text{ cm}$ ($4 \text{ cm} + 0.5 \text{ cm}$).



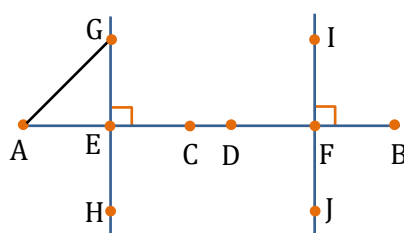
Step 2: Take points E and F on AB such that $AE = 2 \text{ cm}$ and $FB = 2 \text{ cm}$. E is the mid-point of AC and F is the mid-point of DB.



Step 3: Take points E and F on AB such that $AE = 2$ cm and $FB = 2$ cm. E is the mid-point of AC and F is the mid-point of DB.



Step 4: Using a ruler, take points G, H, I, and J such that EG, EH, FI, and FJ are all equal to 1.5 cm. Equal distance can also be slightly less than or greater than 1.5 cm.



Step 5: With the centre at G, draw an arc from A to C of a radius equal to AG. Similarly, with the centre at H, I, and J draw arcs of radius equal to AG. Erase the extra lines as show



Step 6: At points E and F, draw two black dots of big size.



Step 7: Figure represents the required depiction of "Eyes".

8.1 ARTWORK

1. What radius should be taken in the compass to get this half-circle? What should be the length of AX?

Sol. We have $AB = 8$ cm.

Since the "Wavy Wave" has two equal half circles, we have $AX = XB$.

X is the mid-point of AB.

$$AX = 8/2 = 4 \text{ cm}$$

The length of AX is 4 cm.

Let M be the mid-point of AX.

$$AM = MX = 4/2 \text{ cm} = 2 \text{ cm}$$

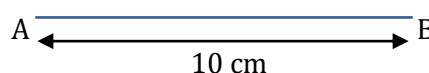
The center of the half circle is M.

Radius of half circle = $AM = 2$ cm

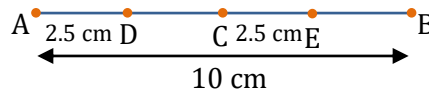
The radius of the half circle is 2 cm.

2. Take a central line of a different length and try to draw the wave on it.

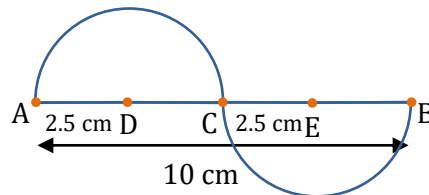
Sol. Step 1: We start with the central line of different lengths, say, 10 cm.



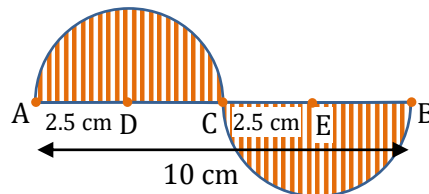
Step 2: Since $\frac{10}{2} = 5$, using a ruler, take point C on AB such that AC = 5 cm. C is the mid-point of AB. As $5 \div 2 = 2.5$, using a ruler, take points D on AC and E on CB such that AD = 2.5 cm and CE = 2.5 cm. D is the mid-point of AC and E is the mid-point of CB.



Step 3: With centre at D, draw a half circle above the central line AB and of radius 2.5 cm. With centre at E, draw a half circle below the central line AB and of radius 2.5 cm.



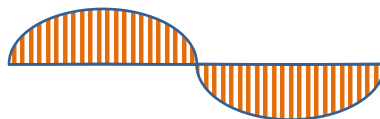
Step 4: Draw vertical lines in the half circles above and below the line AB.



Step 5: The figure represents the required depiction of the given “Wavy Wave” with the central line of length 10 cm.

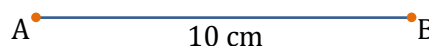
3. Try to recreate the figure where the waves are smaller than a half circle (as appearing in the neck of the figure ‘A Person’). The challenge here is to get both the waves to be identical. This may be tricky!

Sol. We shall draw a “Wavy Wave”



Here, the waves are smaller than a half circle.

Step 1. We start with the central line AB of length 10 cm, say.



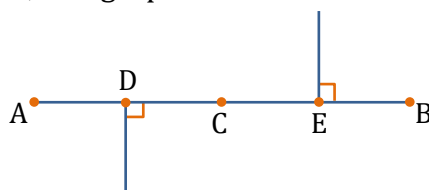
Step 2. Since $10 \div 2 = 5$, using a ruler take a point C on AB such that AC = 5 cm. C is the mid-point of AB.

Since $5 \div 2 = 2.5$, using a ruler, take points D on AC and E on CB such that AD = 2.5 cm and CE = 2.5 cm.

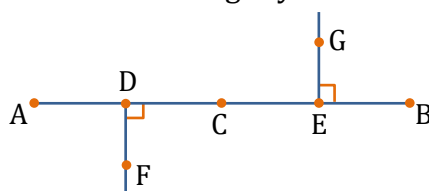
D is the mid-point of AC and E is the mid-point of CB.



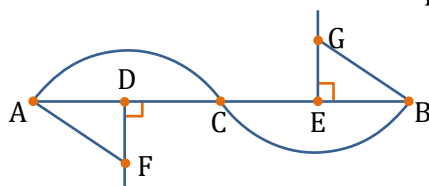
Step 3. At D, draw a perpendicular line below AB, using a protractor. At E, draw a perpendicular line above AB, using a protractor.



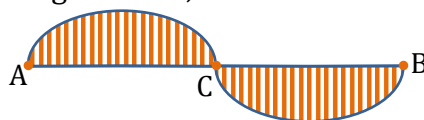
Step 4. Using a ruler, mark points F and G such that $DF = 1.5$ cm and $EG = 1.5$ cm. Equal distance between DF and EG can also be slightly less than or greater than 1.5 cm.



Step 5. Join AF and BG. With the centre at F, draw an arc from A to C of a radius equal to AF. With the centre at G, draw an arc from B to C of a radius equal to GB.



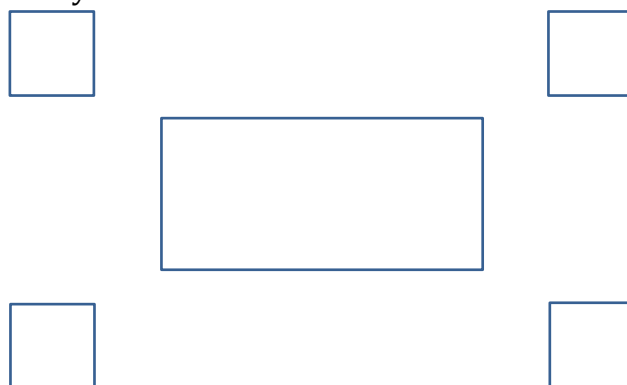
Step 6. Draw vertical lines in figure. Also, erase the extra lines as shown in figure.



Step 7. Figure represents the required depiction of a “Wavy Wave”, where the waves are smaller than a half circle.

8.2 SQUARES AND RECTANGLES

1. Draw the rectangle and four squares configuration (shown below) on a dot paper. What did you do to recreate this figure so that the four squares are placed symmetrically around the rectangle? Discuss with your classmates.



Sol. Step 1: Take a square dot paper and mark a dot on it at A. Start from A move 10 dots to the right and mark the tenth dot at B.

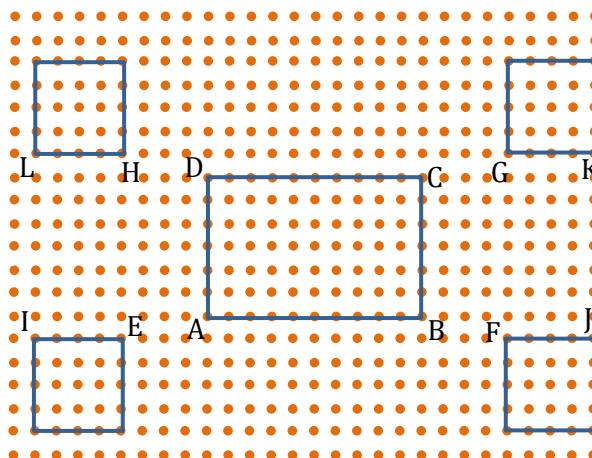
Step 2: Start from B and move 6 dots above B and mark the 6th dot as C. Start from A and move 6 dots above A and mark the 6th dot as D. Join AB, BC, CD, and DA.

Step 3: Take points E, F, G, and H on the dot paper as shown in the figure.

Step 4: Take points I, J, K, and L at a distance of 4 dots from E, F, G, and H respectively. Join IE, FJ, GK, and LH.

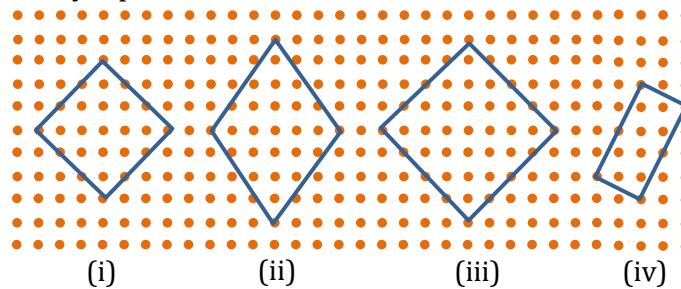
Step 5: On LH and GK, construct squares above the rectangle.

Step 6: On IE and FJ, construct squares below the rectangle.



Step 7: The figure is the required configuration of one rectangle and four squares on a square dot paper.

2. Identify if there are any squares in this collection. Use measurements if needed.



Think:

Is it possible to reason out if the sides are equal or not, and if the angles are right or not without using any measuring instruments in the above figure? Can we do this by only looking at the position of corners in the dot grid?

Sol:

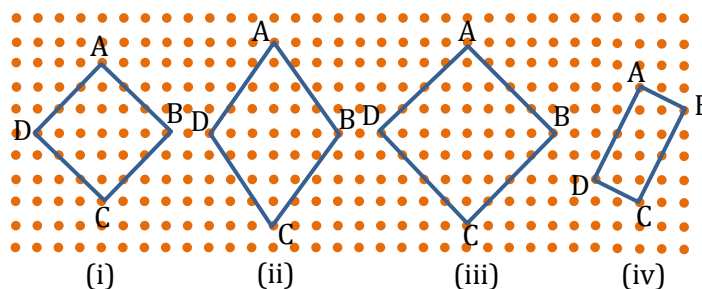


Fig. (i): In this figure, counting dots between sides, we find that AB, BC, CD, and DA are all equal sides. Also, the position of the dots on the sides shows that each angle of ABCD is 90° .

$\therefore$ ABCD is a square.

Fig. (ii): In this figure, $\angle BAD$ is not equal to 90° . So, ABCD cannot be a square.

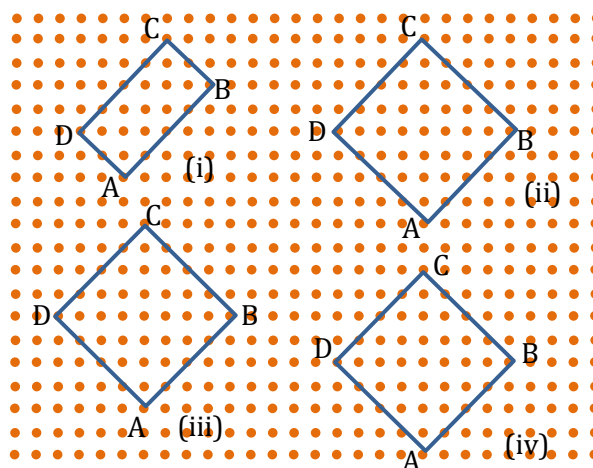
Fig. (iii): In this figure, counting dots between sides, we find that AB, BC, CD, and DA are all equal sides. Also, using a protractor, we find that each angle of ABCD is 90° .

$\therefore$ ABCD is a square.

Fig. (iv): In this figure, AB and BC are not equal. So, ABCD cannot be a square.

3. Draw at least 3 rotated squares and rectangles on a dot grid. Draw them such that their corners are on the dots. Verify if the squares and rectangles that you have drawn satisfy their respective properties.

Sol. We draw 3 rotated squares and rotated rectangles on a dot grid such that the corners of squares and rectangles are on dots.



We have drawn 3 rotated squares (ii and iii) and rotated rectangles (i). These squares and rectangles are drawn keeping in view the number of dots between sides and also the position of sides.

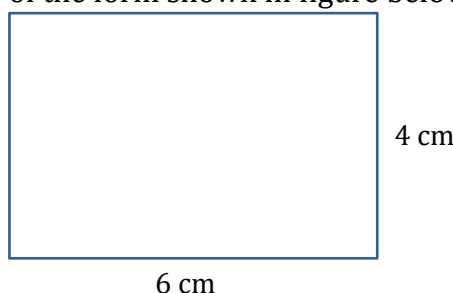
Using a ruler, we find that the opposite sides of figures (i) are equal and all sides of figures (ii), (iii), (iv) are equal.

$\therefore$ By definition, figures (i) is rectangles, and figures (ii) and (iii), (iv) are squares.

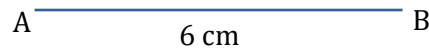
8.3 CONSTRUCTING SQUARES AND RECTANGLES

1. Draw a rectangle with sides of length 4 cm and 6 cm. After drawing, check if it satisfies both the rectangle properties.

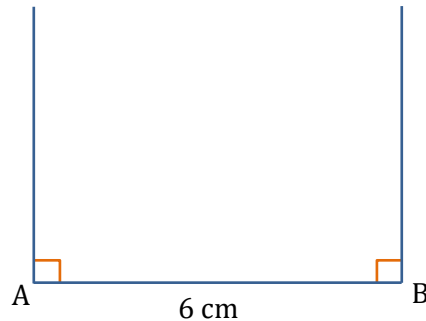
Sol: We shall draw a rectangle of the form shown in figure below.



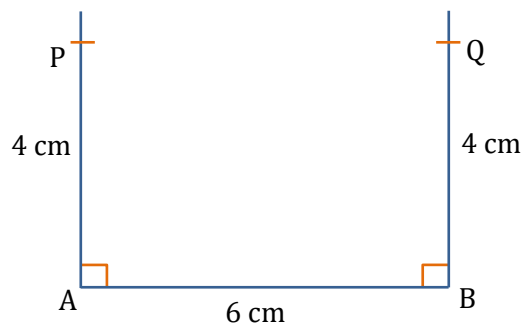
Step 1: Using a ruler, draw a line AB equal to 6 cm.



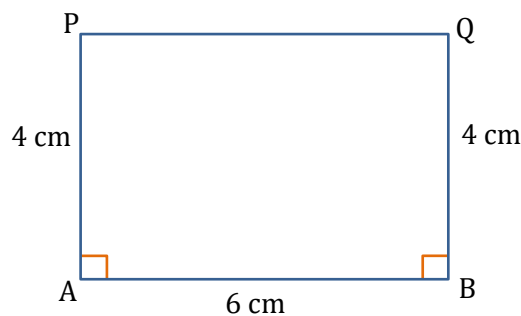
Step 2: Using a protractor, draw perpendicular lines at A and B



Step 3: Using a ruler, mark point P on the perpendicular line at A such that AP = 4 cm. Using a ruler, mark point Q on the perpendicular line at B such that BQ = 4 cm.



Step 4: Join P and Q using a ruler. Erase the lines above P and Q.



Step 5: Using a ruler, verify that PQ is of length 6 cm. Using a protractor, verify that $\angle P$ and $\angle Q$ are 90° each.

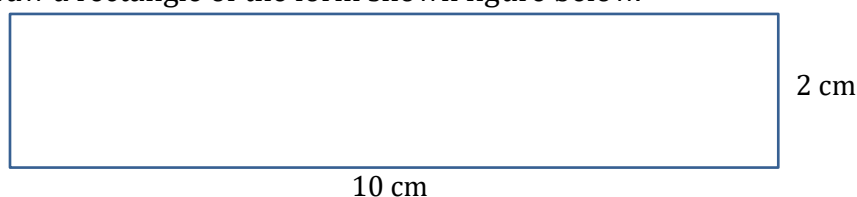
Step 6: We have:

- (i) $AB = PQ = 6 \text{ cm}$ and $AP = BQ = 4 \text{ cm}$
- (ii) $\angle A = \angle B = \angle Q = \angle P = 90^\circ$.

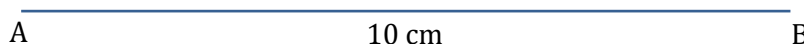
Step 7: ABQP is the required rectangle of sides 4 cm and 6 cm.

2. Draw a rectangle of sides 2 cm and 10 cm. After drawing, check if it satisfies both the rectangle properties.

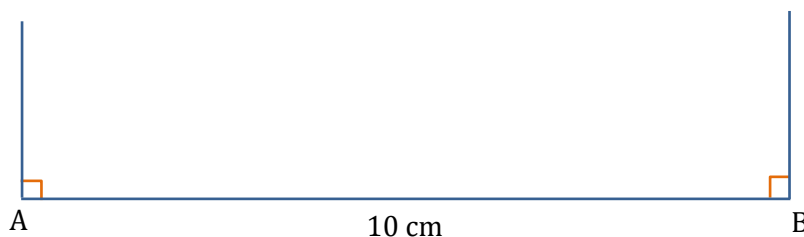
Sol. We shall draw a rectangle of the form shown figure below.



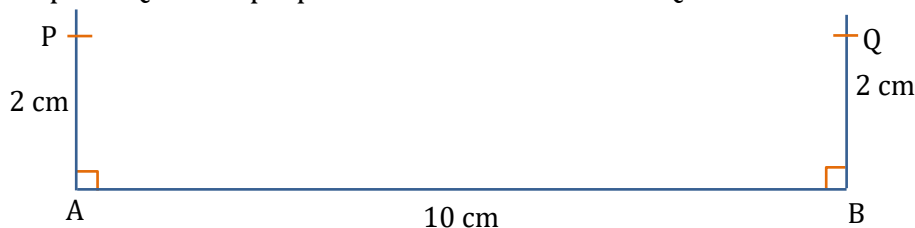
Step 1: Using a ruler, draw a line AB equal to 10 cm.



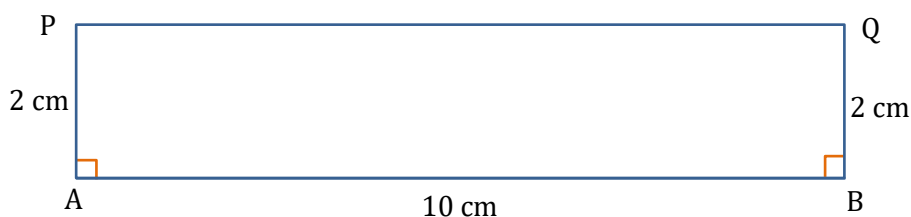
Step 2: Using a protractor, draw perpendicular lines at A and B.



Step 3: Using a ruler, mark point P on the perpendicular at A such that AP = 2 cm. Using a ruler, mark point Q on the perpendicular at B such that BQ = 2 cm.



Step 4: Join P and Q using a ruler. Erase the lines above P and Q.



Step 5: Using a ruler, verify that PQ is of length 10 cm. Using a protractor, verify that $\angle P$ and $\angle Q$ are 90° each.

Step 6: We have:

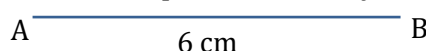
- (i) $AB = PQ = 10$ cm and $AP = BQ = 2$ cm
- (ii) $\angle A = \angle B = \angle Q = \angle P = 90^\circ$.

Step 7: ABQP is the required rectangle of sides 2 cm and 10 cm.

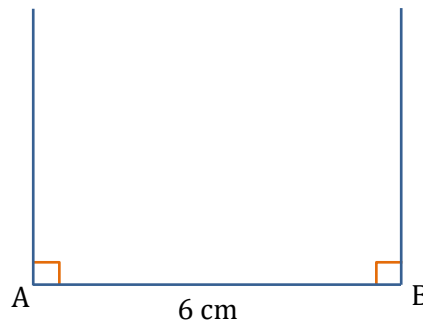
3. Is it possible to construct a 4-sided figure in which-

- all the angles are equal to 90° but
- opposite sides are not equal?

Sol. Step 1: Using a ruler, draw a line AB equal to 6 cm, say.

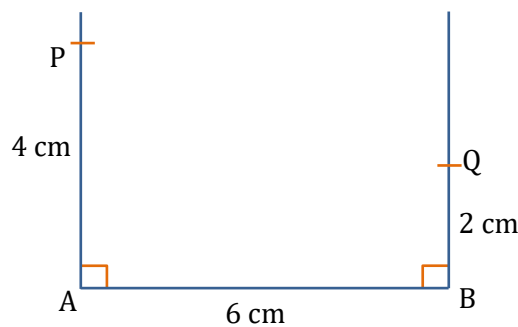


Step 2: Using a protractor, draw perpendicular lines at A and B.

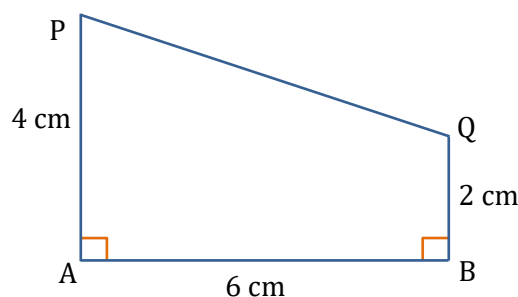


Step 3: Using a ruler, mark point P on the perpendicular at A such that $AP = 4$ cm.

Using a ruler, mark point Q on the perpendicular at B such that $BQ = 2$ cm, which is not equal to AP.



Step 4: In figure, the opposite sides i.e. AP and BQ are not equal. Join P and Q using a ruler. Erase the lines above P and Q.



Step 5: Using a protractor, we find that neither $\angle P$ nor $\angle Q$ is 90° .

Step 6: We conclude that it is not possible to construct a 4-sided figure in which all angles are 90° and opposite sides are not equal.

8.4 AN EXPLORATION IN RECTANGLES

★ Construct

1. Breaking Rectangles

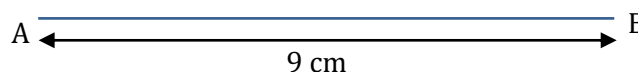
Construct a rectangle that can be divided into 3 identical squares as shown in the figure.



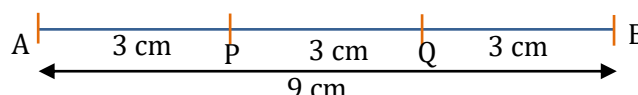
Sol. We shall draw a rectangle of the form shown in figure below.

Step 1. Let us keep the vertical side of the rectangle to 3 cm. Since the rectangle is to be divided into three identical squares, the length of the rectangle must be $3\text{ cm} + 3\text{ cm} + 3\text{ cm} = 9\text{ cm}$.

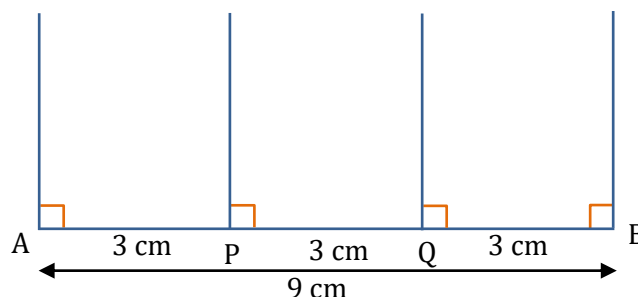
Step 2. Using a ruler, draw a line AB equal to 9 cm.



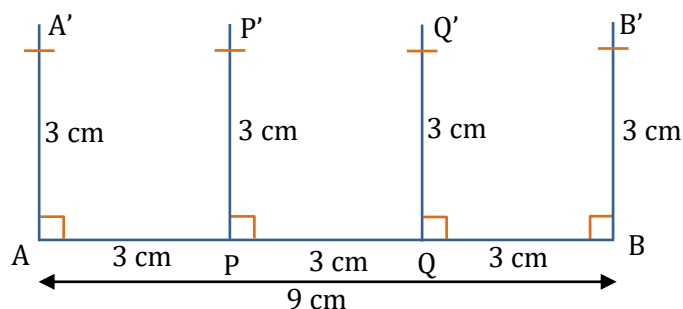
Step 3. Using a ruler, find points P and Q on AB such that $AP = 3\text{ cm}$ and $PQ = 3\text{ cm}$. Here, QB is also 3 cm.



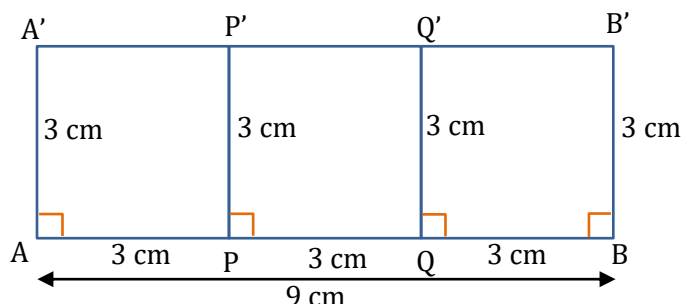
Step 4. Using a protractor, draw perpendicular lines at A, P, Q, and B.



Step 5. Using a ruler, mark points A', P', Q', and B' on perpendiculars at A, P, Q, and B respectively such that $AA' = PP' = QQ' = BB' = 3\text{ cm}$.



Step 6. Join A' and P', P' and Q', and Q' and B' using a ruler. Erase the lines above A', P', Q', and B'.

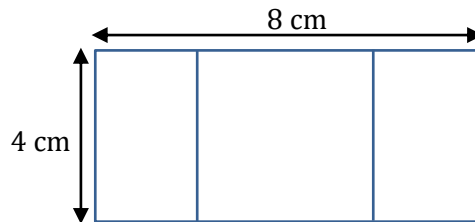


Step 7. ABB'A' is the required rectangle which is divided into 3 identical squares APP'A', PQQ'P', and QBB'Q'.

★ **Construct**

1. A Square within a Rectangle

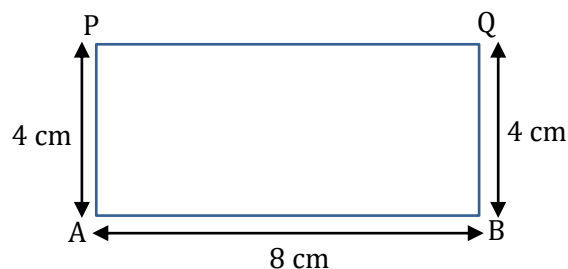
Construct a rectangle of sides 8 cm and 4 cm. How will you construct a square inside, as shown in the figure, such that the centre of the square is the same as the centre of the rectangle?



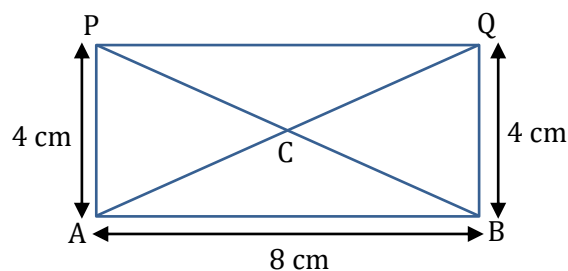
Hint: Draw a rough figure. What will be the side length of the square? What will be the distance between the corners of the square and the outer rectangle?

Sol: The centre of a rectangle (or square) is the point of intersection of its diagonals.

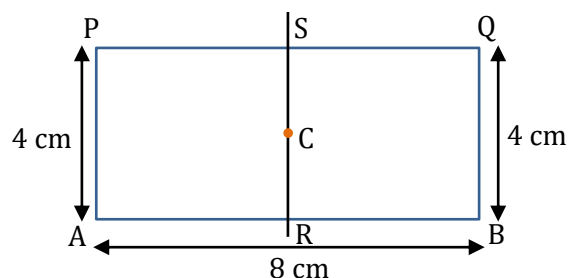
Step 1: Using a ruler, draw a line AB equal to 8 cm. Using a protractor, draw perpendicular lines at A and B. Using a ruler, mark point P on the perpendicular line at A such that AP = 4 cm. Using a ruler, mark point Q on the perpendicular line at B such that BQ = 4 cm. Join P and Q using a ruler. Erase the lines above P and Q.



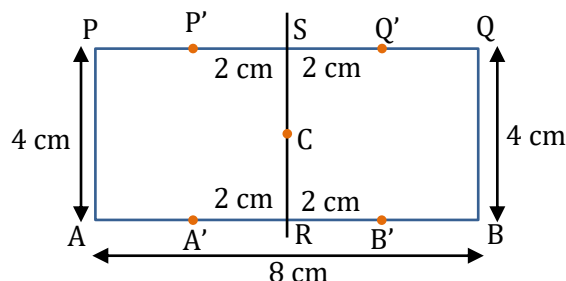
Step 2: Draw diagonals AQ and BP, using a ruler. Let the diagonals intersect at C. This point is the centre of the rectangle ABQP and of the required square.



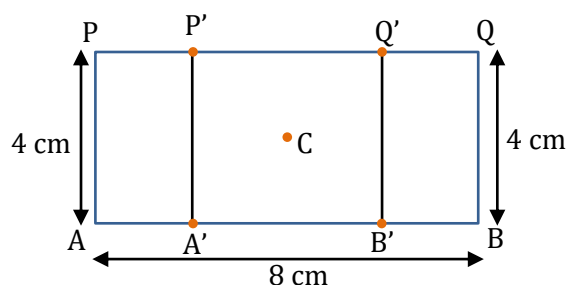
Step 3: Erase diagonals AQ and BP. Using a protractor, draw a perpendicular line on AB and pass through the centre C. Let this perpendicular meet AB at R and PQ at S.



Step 4: Since $AP = 4$ cm, each side of the square must be 4 cm. Using a ruler, mark points A' and B' on AB such that $A'R = 2$ cm and $RB' = 2$ cm. Thus, $A'B' = A'R + RB' = 2$ cm + 2 cm = 4 cm. Similarly, using a ruler, mark points P' and Q' on PQ such that $P'S = 2$ cm and $SQ' = 2$ cm. Thus, $P'Q' = P'S + SQ' = 2$ cm + 2 cm = 4 cm.

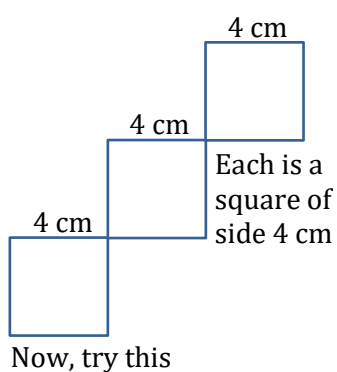


Step 5: Using a ruler, join A' and P' and also B' and Q' . Erase the line RS .

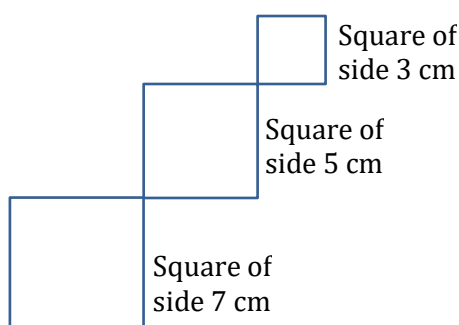


Step 6: In $A'B'Q'P'$ is the required square with centre C , which is also the centre of the given rectangle.

2. Falling Squares



Make sure that the squares are aligned the way they are shown.

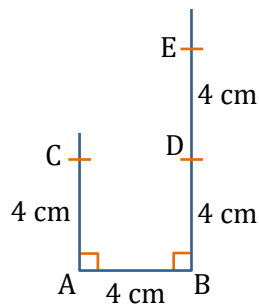


Sol. In the given figure, there are three falling squares and the side of each square is 4 cm.

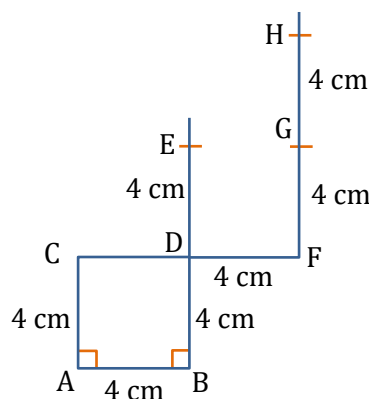
Step 1. Using a ruler, draw a line AB equal to 4 cm. Using a protractor, draw perpendicular lines at A and B.

Using a ruler, mark point C on a perpendicular line at A such that AC = 4 cm.

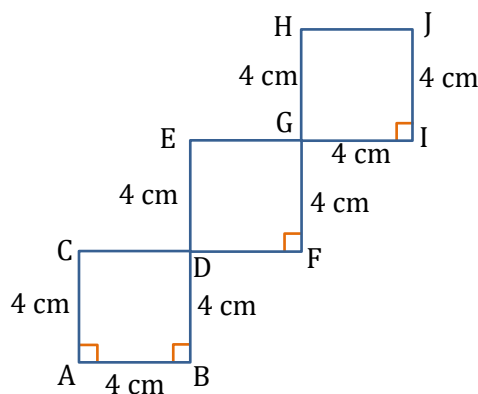
Using a ruler, mark points D and E on a perpendicular line at B such that BD = 4 cm and DE = 4 cm.



Step 2. Join C and D. Produce CD to F such that DF = 4 cm. Using a protractor, draw a perpendicular line at F. Using a ruler, mark points G and H on a perpendicular line at F such that FG = 4 cm and GH = 4 cm.



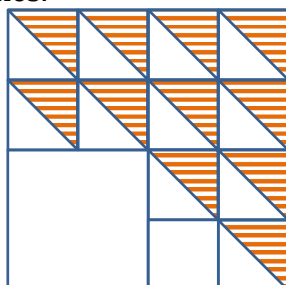
Step 3. Join E and G. Produce EG to I such that GI = 4 cm. Using a protractor, draw a perpendicular line at I. Using a ruler, mark point J on the perpendicular line at I such that IJ = 4 cm. Join H and J. Erase extra lines in the figure.



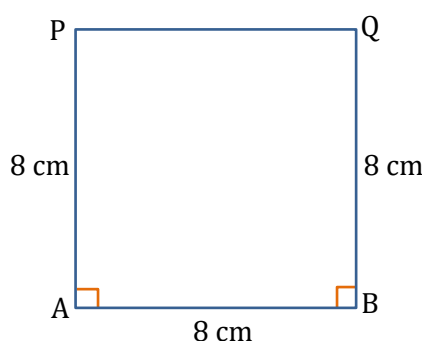
Step 4. The required figure of three “falling squares” each of side 4 cm.

3. Shading

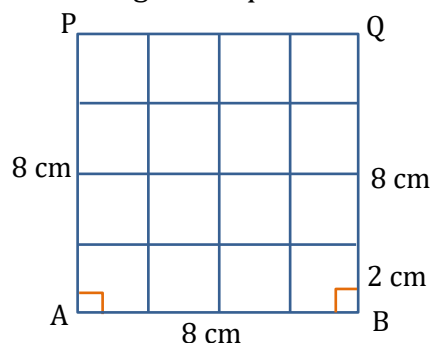
Construct this. Choose measurements of your choice. Note that the larger 4-sided figure is a square and so are the smaller ones.



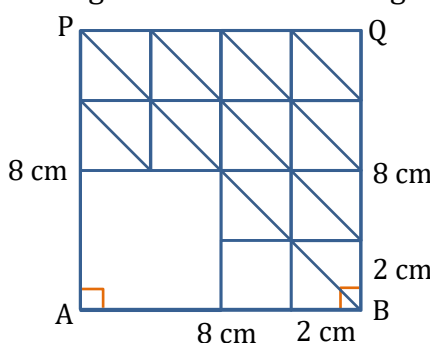
Sol. Step 1. Using a ruler, draw a line AB equal to 8 cm. As, $8 \div 4 = 2$, we shall draw smaller squares of side 2 cm. Using a protractor, draw perpendicular lines at A and B. Using a ruler, mark point P on the perpendicular line at A such that AP = 8 cm. Using a ruler, mark point Q on the perpendicular line at B such that BQ = 8 cm. Join P and Q using a ruler. Erase the lines above P and Q.



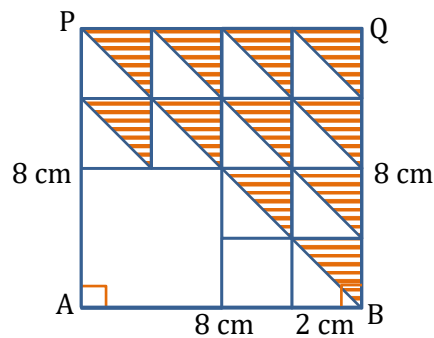
Step 2. On the lines AB, BQ, QP, and PA, mark points at distances of 2 cm, using a ruler. Draw horizontal lines and vertical lines to get 16 squares.



Step 3. From corner A, erase the inner sides of four squares to get a square of side 4 cm with one corner at A. Draw parallel diagonals of the remaining 12 small squares of side 2 cm each.

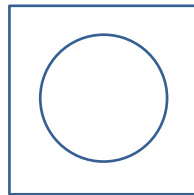


Step 4. In the 12 small squares, draw horizontal lines in the portion above the diagonals.



Step 5. The required figure having 12 small squares in a square.

4. Square with a Hole



Observe that the circular hole is the same as the centre of the square

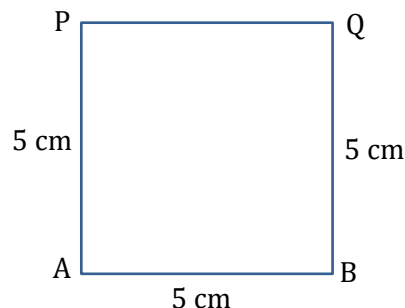
Hint: Think where the centre of the circle should be.

Sol. Observe that the circular hole is the same as the centre of the square.

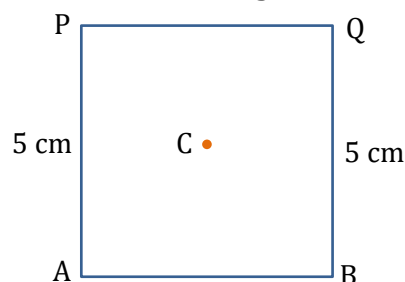
Construct a “Square with a Hole” as shown in the given figure. The centre of the hole is the same as the centre of the square.

The centre of a square is the point of intersection of its diagonals. This centre is also the centre of the hole in the figure.

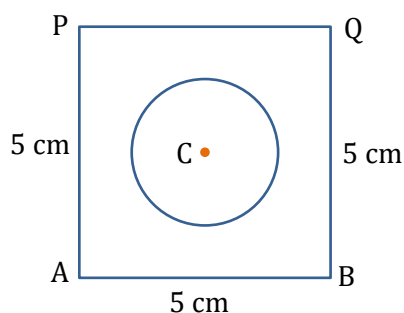
Step 1. Using a ruler, draw a line AB equal to 5 cm, say. Using a protractor, draw perpendicular lines at A and B. Using a ruler, mark point P on the perpendicular line at A such that AP = 5 cm. Using a ruler, mark point Q on the perpendicular line at B such that BQ = 5 cm. Join P and Q using a ruler. Erase the lines above P and Q.



Step 2. Draw diagonals AQ and BP using a ruler. Let the diagonals intersect at C. This point is the centre of the square ABQP. Erase the diagonals AQ and BP.



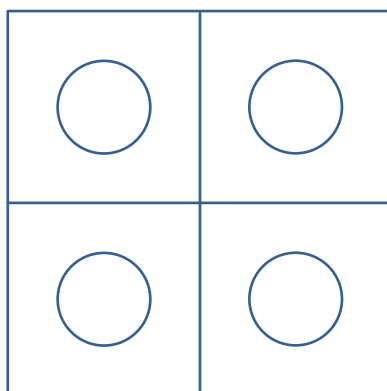
Step 3. With centre at C and a radius of 1.5 cm, say, draw a circle using a compass.



Step 4. The required “Square with a Hole”.

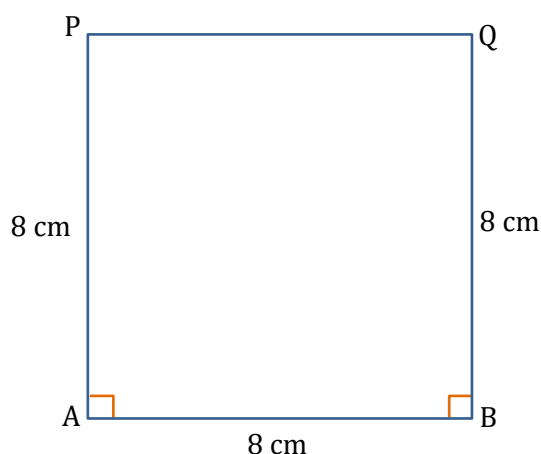
5. Square with more Holes

Construct a “Square with Four Holes” as shown in the given figure.

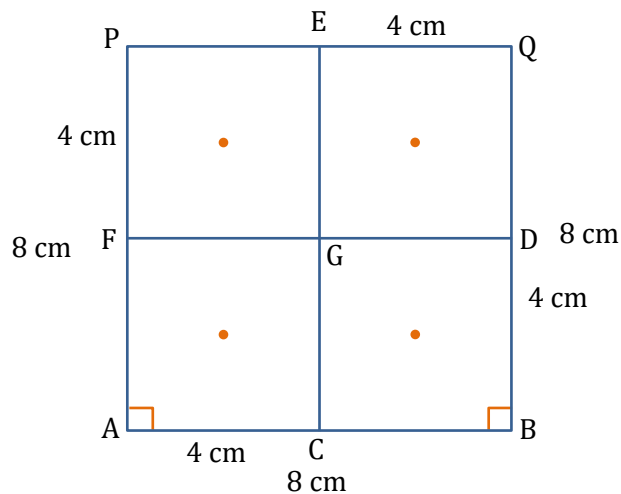


Sol. In the figure, the centre of a circle is the same as that of the corresponding square.

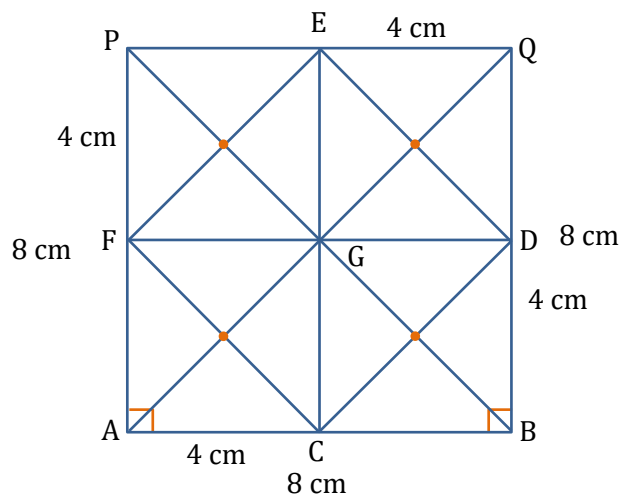
Step 1: Using a ruler, draw a line AB equal to 8 cm, say. Using a protractor, draw perpendicular lines at A and B. Using a ruler, mark point P on the perpendicular line at A such that AP = 8 cm. Using a ruler, mark point Q on the perpendicular line at B such that BQ = 8 cm. Join P and Q using a ruler. Erase the lines above P and Q.



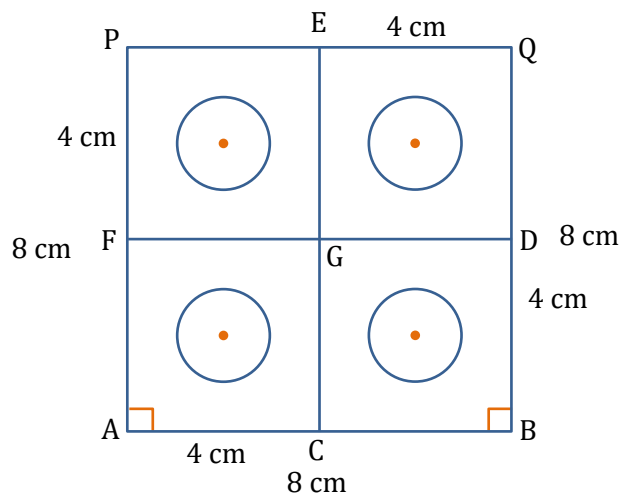
Step 2: Using a ruler, find points C, D, E, and F such that $AC = 4$ cm, $BD = 4$ cm, $QE = 4$ cm, and $PF = 4$ cm. Join C and E and also F and D.



Step 3: Let G be the intersection of lines FD and CE. Find the centres of squares ACGF, CBDG, DQEG, and GEFP by joining their respective diagonals.

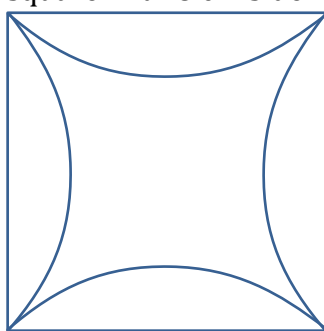


Step 4: Erase the extra lines used for finding the centres of the smaller circles. With centre at centres of small squares, draw four circles of radius 1.3 cm, say.



Step 5: The required “Square with Four Holes”.

6. **Square with Curves:** This is a square with 8 cm side lengths.

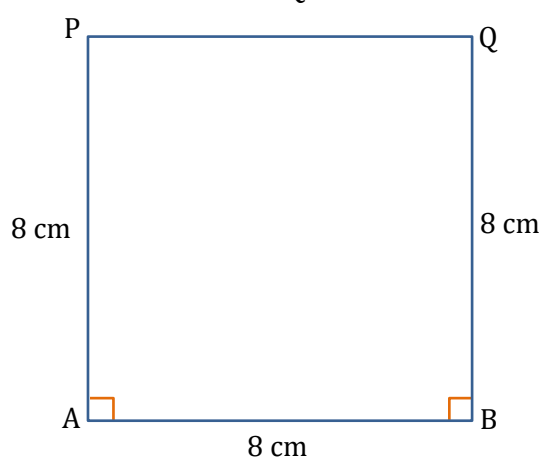


Construct a “Square with Curves”, taking a square of side 8 cm as shown in the figure.

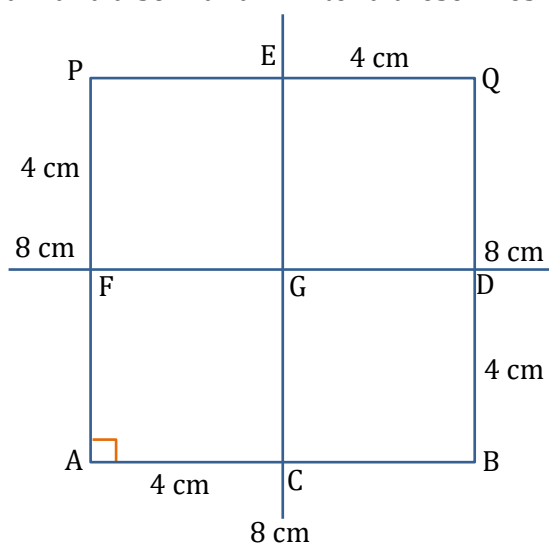
Hint: Think where the tip of the compass can be placed to get all 4 arcs to bulge uniformly from each of the sides. Try it out!

Sol. In the given figure, the centres of the four arcs are outside the square.

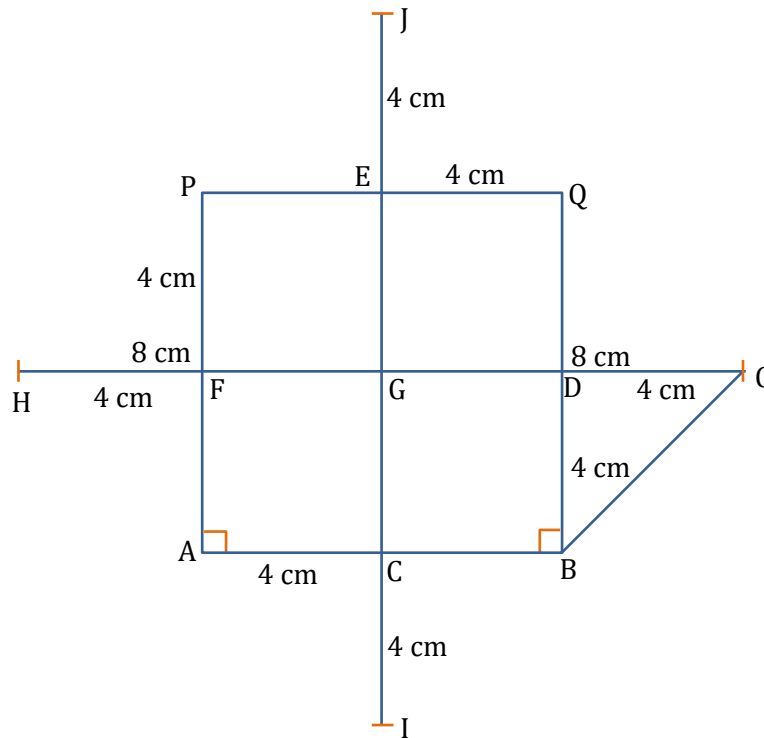
Step 1: Using a ruler, draw a line AB equal to 8 cm. Using a protractor, draw perpendicular lines at A and B. Using a ruler, mark point P on the perpendicular line at A such that AP = 8 cm. Using a ruler, mark point Q on the perpendicular line at B such that BQ = 8 cm. Join P and Q using a ruler. Erase the lines above P and Q.



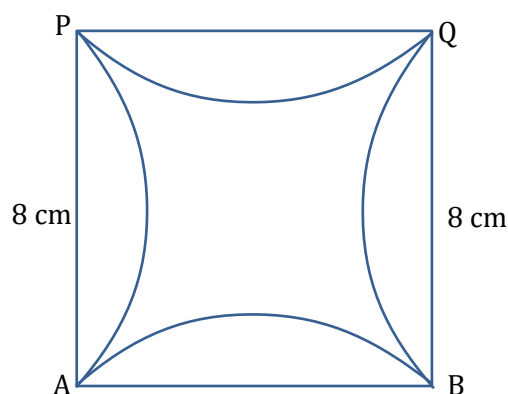
Step 2: Using a ruler, mark points C, D, E, and F such that AC = 4 cm, BD = 4 cm, QE = 4 cm, and PF = 4 cm. Join C and E and also D and F. Extend these lines outside the square.



Step 3: Extend DF and take points G and H on it so that DG and FH are equal to 4 cm. Extend CE and take points I and J on it so that CI and EJ are equal to 4 cm. The distance 4 cm can be taken slightly less than or greater than 4 cm. Join B and G.



Step 4: With centres at G, H, I, and J and a radius equal to BG, draw four arcs inside the square as shown in the given figure. Erase the extra lines.

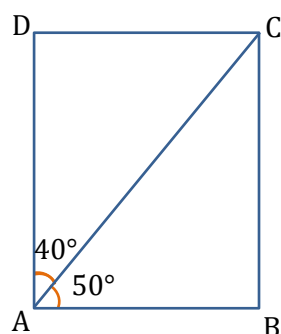


Step 5: The required “Square with Curves” with the square of side 8 cm.

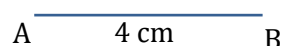
8.5 EXPLORING DIAGONALS OF RECTANGLES AND SQUARES

- Construct a rectangle in which one of the diagonals divides the opposite angles into 50° and 40° .

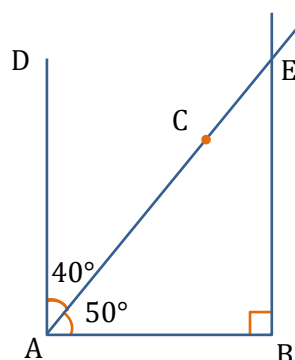
Sol. We shall draw a rectangle of the form shown in figure.



Step 1: Using a ruler, draw a line AB equal to 4 cm, say.

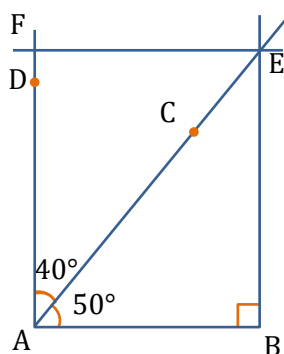


Step 2: Using a protractor, mark dots C and D at angles 50° and 90° ($50^\circ + 40^\circ$), keeping the central point of the protractor at A.

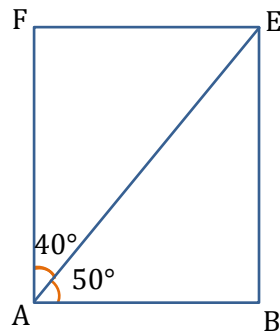


Step 3: Using a protractor, draw a perpendicular line to AB at B and let it intersect the extended line AC at E.

Step 4: Using a protractor, draw a perpendicular line to BE at E and let it intersect the extended line AD at F.



Step 5: Erase the extra lines in figure.



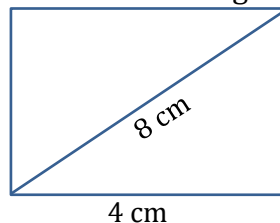
Step 6: Above figure is the required rectangle in which one of the diagonals divides the opposite angles into 50° and 40° .

2. Construct a rectangle in which one of the diagonals divides the opposite angles into 45° and 45° . What do you observe about the sides?

Sol. Do it yourself.

3. Construct a rectangle one of whose sides is 4 cm and the diagonal is of length 8 cm.

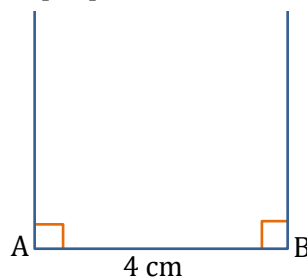
Sol. We shall draw a rectangle of the form shown in figure below.



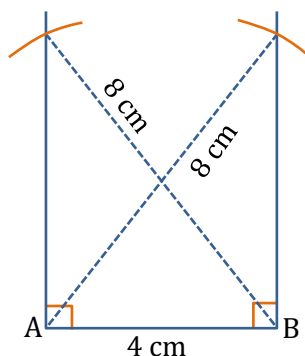
Step 1: Using a ruler, draw a line AB equal to 4 cm.



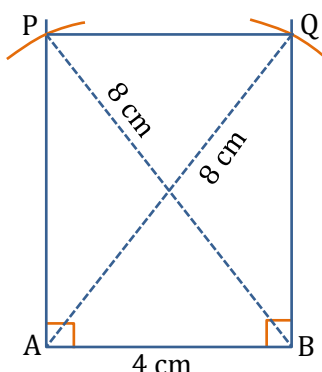
Step 2: Using a protractor, draw a perpendicular line to AB at A and B.



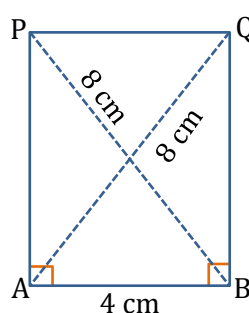
Step 3: With the centre at A and a radius equal to 8 cm, draw an arc to intersect the perpendicular at B. Similarly, draw an arc of radius 8 cm with a centre at B to intersect perpendicular at A.



Step 4: Join the points of intersection of arcs by PQ.



Step 5: Erase the extra lines in



Step 6: The required rectangle with one side equal to 4 cm and diagonals of length 8 cm.

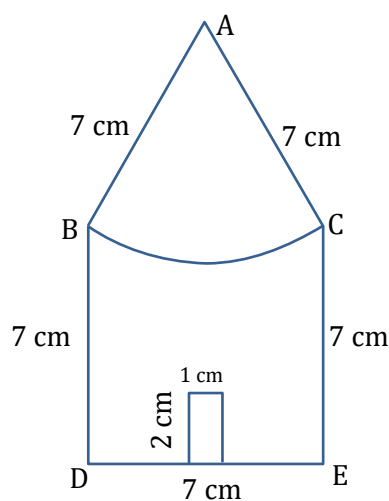
4. Construct a rectangle one of whose sides is 3 cm and the diagonal is of length 7 cm.

Sol. Do yourself.

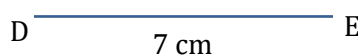
8.5 EXPLORING DIAGONALS OF RECTANGLES AND SQUARES

1. Construct a bigger house in which all the sides are of length 7 cm.
Recreate the given figure. Note that all the lines forming the border of the house are of length 7 cm.

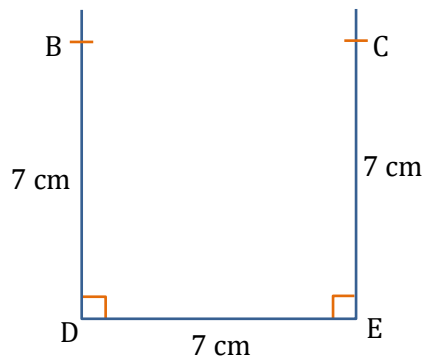
Sol.



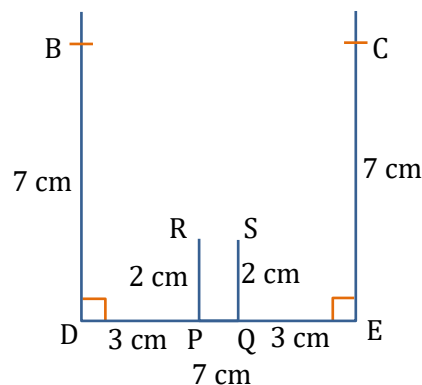
Step 1: Using a ruler, draw a line DE equal to 7 cm.



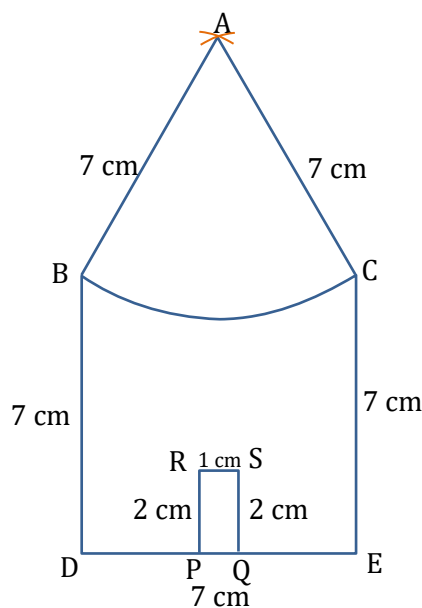
Step 2: Using a protractor, draw perpendicular lines to DE at D and E. Take point B perpendicular at D such that BD is 7 cm. Take point C on perpendicular at E such that CE is 7 cm.



Step 3: $7\text{ cm} - 1\text{ cm} = 6\text{ cm}$ and $6\text{ cm} \div 2 = 3\text{ cm}$. Using a ruler, take points P and Q on DE such that DP = 3 cm and QE = 3 cm. Using a protractor, draw perpendiculars to DE at P and Q of length 2 cm each.



Step 4: Join R and S. With centres at B and C and a radius of 7 cm, draw arcs to intersect at point A. Join AB and AC. With the centre at A and a radius of 7 cm, draw an arc from B to C. Also, erase the extra lines.



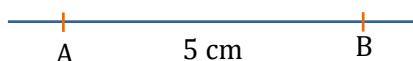
Step 5: The required recreation of the given house with all the lines forming the border of the house of length 7 cm.

2. Try to recreate 'A Person', 'Wavy Wave', and 'Eyes' from the section Artwork, using ideas involved in the 'House' construction.

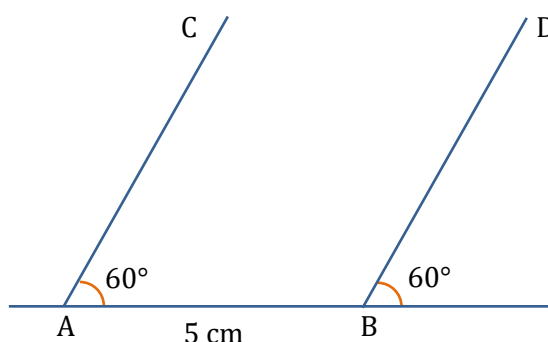
Sol. Do yourself.

3. Is there a 4-sided figure in which all the sides are equal in length but are not squares? If such a figure exists, can you construct it?

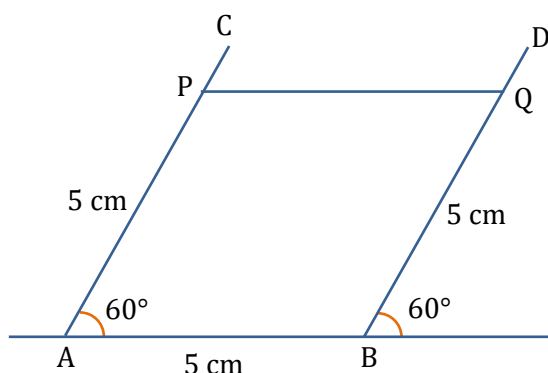
Sol. Step 1: Draw a line and take points A and B on it such that $AB = 5$ cm, say.



Step 2: Using a protractor, take points C and D such that angles on the right of A and on the right of B are 60° each.



Step 3: Using a ruler, take point P on AC such that $AP = 5$ cm and Q on BD such that $BQ = 5$ cm. Join P and Q.



Step 4: Using a ruler, we measure the distance PQ. PQ is equal to 5 cm. Thus, in figure ABQP, each side is equal to 5 cm. Here $\angle A$ is 60° , which is not equal to 90° .

$\therefore$ ABQP is not a square.

Step 5: We find that there are 4-sided figures in which all the sides are equal in length but are not squares.

