MATHS

BOOKS - ICSE

CONSTRUCTIONS

Example

1. Draw a line l. Take any point A outside the line. Draw a line through A, parallel to line l.

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2. Draw a line l. Construct a line m parallel to line l at a distance of 4 cm.

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3. Construct a triangle ABC with AB = 7 cm, BC = 3 cm, and CA = 5 cm.

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4. Construct Δ PQR with PQ = 4.8 cm, RP = 5.5 cm, and $\angle RPQ = 60^\circ$

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5. Construct a triangle XYZ where $\angle X = 60^\circ$, $\angle Y = 40^\circ$, and XY = 5 cm.

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6. Construct Δ ABC with $\angle C = 90^\circ$, AB = 6 cm and CA = 4 cm.

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7. Construct a triangle ABC with AB = 4.5 cm, AC = 8 cm, and $\angle C = 30^\circ$. Is such a triangle unique ? If another triangle with the same dimensions as given but a different shape is possible, then construct that triangle as well.

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Try This

1. Construct Δ ABC with sides AB = 7 cm, BC = 5 cm, CA = 6 cm.

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2. Construct an equilateral triangle of sides 6 cm each.

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3. Construct ΔABC with AB = 8 cm, BC = 6 cm, and CA = 7 cm. Find the midpoint D on AB. Through the point D, draw DE parallel to BC, meeting AC at E. Measure DE. Find DE : BC.

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4. Construct a triangle ABC with sides AB = 7 cm, BC = 6 cm and $\angle ABC = 45^\circ$, using a compass and a scale.

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5. Draw an isosceles triangle in which each of the equal sides is of length 3 cm and the angle between them is 45^0.

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6. Construct a parallelogram ABCD with $\angle A = 60^\circ$ and adjacent sides AB = 4 cm and AD = 7 cm.

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7. Construct a Δ ABC, with AB = 5 cm, $\angle A = 45^\circ$, and $\angle C = 80^\circ$.

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8. Construct a triangle PQR with PQ = 4 cm, $\angle P = 75^\circ$, and $\angle R = 65^\circ$.

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9. Construct Δ ABC with AB = 7 cm, $\angle A = 30^\circ, \angle B = 45^\circ$. Use only compass and scale for construction.

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10. Construct a right-angled triangle with hypotenuse 8.2 cm long and one of the perpendicular sides of length 6 cm.

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11. Construct a right-angled triangle ABC, right-angled at A, with hypotenuse BC = 10 cm long and one of the sides AB = 6 cm long. Also, find the midpoint D of the hypotenuse. Join AD and measure AD.

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12. Construct a right-angled triangled right-angled at A, hypotenuse BC = 6.5 cm and AB = 5 cm. Construct the perpendicular bisectors of AB and AC. Mark the point of intersection of

the perpendicular bisectors as P. Measure PA, PB and PC.

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Exercise 14 1

1. Draw a line l. Take any point A outside the line. Draw a line through A, parallel to line l.

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2. Draw a line segment LM. Draw a line parallel to it at a distance of 5 cm from LM.

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3. Draw a line segment PQ. Take a point S outside this line, and draw a line parallel to PQ, through S. Join S with P. Construct a line parallel to SP, through Q. Mark the point at which it meets the parallel line through S at R. What is the shape of PQRS ?

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4. Construct an equilateral triangle of sides 6 cm each.

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5. Construct an isosceles triangle with equal sides of length 6 cm each and the base of length 7 cm.

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6. Construct an Δ ABC with sides AB = 5 cm, BC = 5.5 cm, and CA = 6 cm.

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7. Construct Δ ABC with AB = 7 cm, BC = 6.5 cm, and CA = 5.5 cm. Find the midpoint D of AB. Draw DE parallel to BC, meeting AC at E. Measure DE. Find AE : EC.

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8. Construct an isosceles triangle with each of its equal sides equal to 6 cm and the angle between them equal to 70°.

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9. Construct a triangle ABC where AB = 7 cm, BC = 6 cm, and CA = 5 cm. Draw the perpendicular bisectors of AB and AC. Mark the point of intersection of the two bisectors as P. Join PA, PB, and PC and measure all these three line segments.

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10. Draw Δ ABC, with AB = 5 cm, BC = 8 cm, and $\angle B = 30^\circ$. Draw the medians through A and B. Mark the point of intersection of the median as P. Join CP and extend it to meet AB at T. Measure TA and TB.

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11. Construct a parallelogram ABCD with $\angle A = 60^\circ$ and adjacent sides AB = 4 cm and AD = 7 cm.

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12. Construct a Δ ABC, with AB = 5 cm, $\angle A = 45^\circ$, and $\angle C = 80^\circ$.

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13. Construct a triangle PQR with PQ = 9 cm, $\angle P = 55^\circ, \angle R = 35^\circ$.

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14. Construct a right-angled triangle ABC, right-angled at A, with hypotenuse BC = 6.3 cm long and one of the sides AB = 4.8 cm long. Also, find the mid-point D of the hypotenuse. Join AD and measure AD.

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15. Construct a right-angled triangle PQR, right-angled at R, with hypotenuse PQ = 7.5 cm long and one of the sides PR = 6 cm long. Also, from the point R, drop a perpendicular on PQ, intersecting PQ at T.

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16. Construct a Δ ABC with $\angle B = 50^\circ$, $\angle C = 60^\circ$, and sides BC = 7.5 cm.

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17. Construct a Δ ABC, with $\angle C = 45^\circ$, AC = 10 cm, and AB = 7 cm. If two different triangles with the same given dimensions can be constructed, then construct both the triangles.

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18. State whether a unique triangle with the given measurements can be constructed :

a. $\Delta ABC, \angle A = 60^\circ, \angle C = 45^\circ$, AC = 9 cm

b. $\Delta ABC, \angle A = 135^\circ, B = 60^\circ$, AB = 7 cm

c. Δ MAP, MA = 8 cm, AP = 12 cm, MP = 3 cm

d. Δ PQR, PQ = 5 cm, QR = 6 cm, $\angle Q = 70^\circ$

e. Δ PQR, PQ = 4 cm, QR = 6 cm, RP = 2 cm

f. Δ LMN, LM = 8 cm, MN = 7 cm, $\angle L = 60^\circ$

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Revision Exercise

1. Draw a line segment AB. Find a point P, 4 cm above the line segment, and draw a line segment parallel to AB through P.

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2. Construct Δ ABC with AB = 4.5 cm, BC = 7 cm and CA = 6 cm.

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3. Construct an isosceles triangle with equal sides of length 6 cm each and the base of length 5 cm.

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4. Construct two isosceles triangles ABC and DBC, with common base BC and the points A and D on opposite sides of BC, given that BC = 8 cm, AB = AC = 4.5 cm, and DB = DC = 5 cm.

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5. Construct a triangle PQR with sides PQ = 5 cm, QR = 4 cm, and $\angle PQR = 100^\circ$.

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6. Construct a parallelogram PQRS with $\angle P = 75^\circ$ and adjacent sides PQ = 7 cm and PS = 5.5 cm.

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7. Draw Δ ABC with AB = 5 cm, $\angle A = 60^\circ$, and $\angle B = 75^\circ$. Use only compass and scale for construction.

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8. Construct a right-angled triangle with hypotenuse 8.2 cm long and one of the perpendicular sides of length 6 cm.

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9. Construct a right-angled triangle ABC, right-angled at A, with hypotenuse BC = 7.5 cm and one of the sides AB = 5.5 cm. Also, from the point A, drop a perpendicular on BC, intersecting BC at D. Find AB : AD.

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10. Construct a right-angled triangle right-angled at A, hypotenuse BC = 8 cm and AB = 5 cm. Construct the perpendicular bisectors of

AB and AC. Mark the point of intersection of the perpendicular bisectors as P. Measure PA, PB and PC.

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11. Construct an isosceles triangle ABC with AB = AC, base BC = 7 cm and altitude from A = 6.5 cm.

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12. Show that it is not possible to construct a unique triangle if the dimensions of the triangle are given as follows : AC = 7 cm, BC = 8 cm and $anl \geq B = 40^{\circ}$.

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