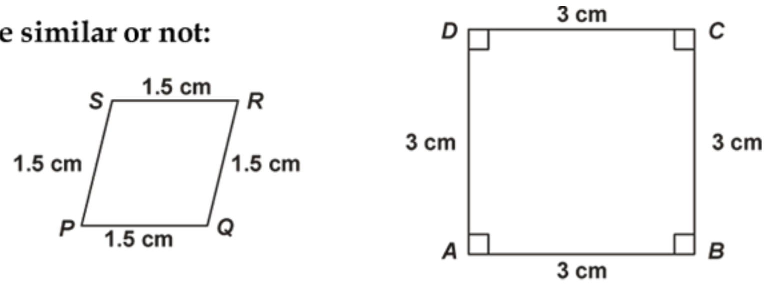
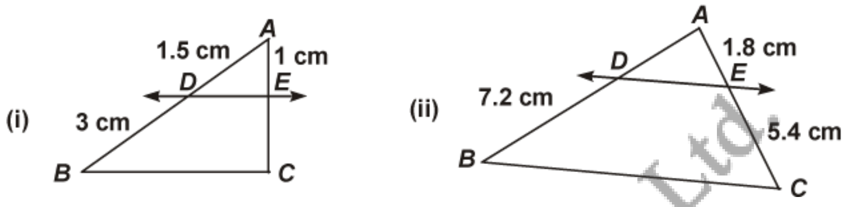
Date: 29/9/2021

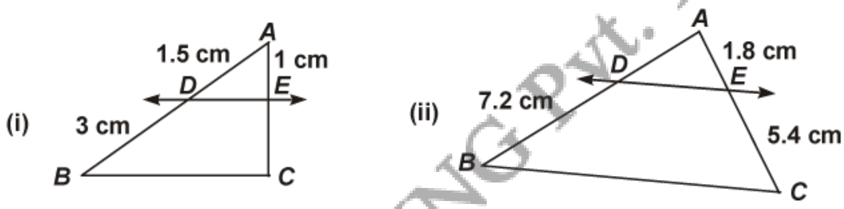
Q1. State whether the following quadrilaterals are similar or not:



Q2. In figure, (i) and (ii) $DE \parallel BC$.
Find EC in (i).

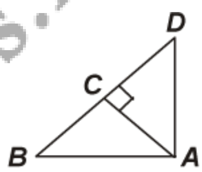


Q3. In figure, (i) and (ii) $DE \parallel BC$.
Find AD in (ii).

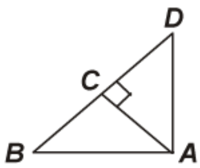


Q4. E and F are points on the sides PQ and PR respectively of a ΔPQR. For each of the following cases, state whether $EF \parallel QR$:
$PE = 3.9$ cm, $EQ = 3$ cm, $PF = 3.6$ cm and $FR = 2.4$ cm

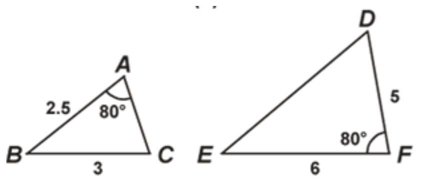
Q5. In figure, ABD is a triangle right angled at A and $AC \perp BD$. Show that $AD^2 = BD \cdot CD$



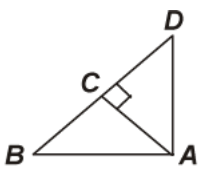
Q6. In figure, ABD is a triangle right angled at A and $AC \perp BD$. Show that $AC^2 = BC \cdot DC$



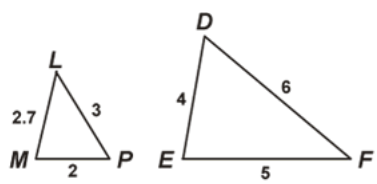
Q7. State which pairs of triangles in figure are similar. Write the similarity criterion used by you for answering the question and also write the pairs of similar triangles in the symbolic form:



Q8. In figure, ABD is a triangle right angled at A and $AC \perp BD$. Show that $AB^2 = BC \cdot BD$



Q9. State which pairs of triangles in figure are similar. Write the similarity criterion used by you for answering the question and also write the pairs of similar triangles in the symbolic form:



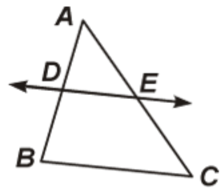
Q10. E and F are points on the sides PQ and PR respectively of a ΔPQR. For each of the following cases, state whether $EF \parallel QR$:

$PE = 4$ cm, $QE = 4.5$ cm, $PF = 8$ cm and $RF = 9$ cm

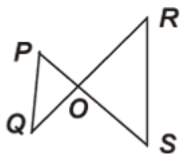
Q11. E and F are points on the sides PQ and PR respectively of a ΔPQR. For each of the following cases, state whether $EF \parallel QR$:

$PQ = 1.28$ cm, $PR = 2.56$ cm, $PE = 0.18$ cm and $PF = 0.36$ cm

Q12. If a line intersects sides AB and AC of a ΔABC at D and E respectively and is parallel to BC, prove that $\frac{AD}{DB} = \frac{AE}{AC}$ (see figure).

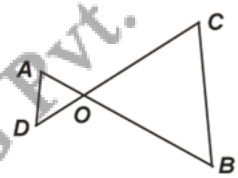


Q13. In figure, if $PQ \parallel RS$, prove that $\Delta POQ \sim \Delta SOR$.



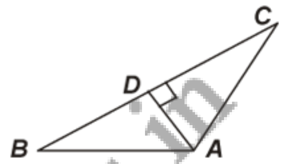
Q14. A ladder is placed against a wall such that its foot is at a distance of 2.5 m from the wall and its top reaches a window 6 m above the ground. Find the length of the ladder.

Q15. In figure, $OA \cdot OB = OC \cdot OD$. Show that $\angle A = \angle C$ and $\angle B = \angle D$.



Q16. In figure, if $AD \perp BC$, prove that

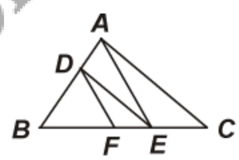
$$AB^2 + CD^2 = BD^2 + AC^2.$$



Q17. Give two different examples of pair of (a) similar figures. (b) non-similar figures.

Q18. In figure, if $DE \parallel AC$ andDF $\parallel AE$, prove that

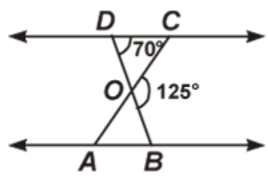
$$\frac{BF}{FE} = \frac{BE}{EC}.$$



Q19. Using Theorem 6.1, prove that a line drawn through the mid-point of one side of triangle parallel to another side bisects the third side. (Recall that you have proved it in Class IX).

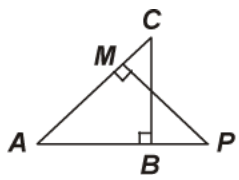
Q20. Using Theorem 6.2, prove that the line joining the mid-points of any two sides of a triangle is parallel to the third side. (Recall that you have done it in class IX).

Q21. In figure, $\Delta ODC \sim \Delta OBA$, $\angle BOC = 125°$ and $\angle CDO = 70°$. Find $\angle DOC$, $\angle DCO$ and $\angle OAB$.



Q22. In figure, ABC and AMP are two right triangles, right angled at B and M respectively. Prove that

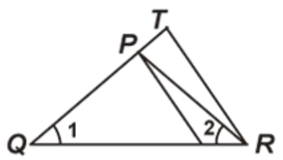
(i) $\Delta ABC \sim \Delta AMP$ (ii) $\frac{CA}{PA} = \frac{BC}{MP}$



Q23. E is a point on the side AD produced of a parallelogram $ABCD$ and BE intersects CD at F. Show that $\Delta ABE \sim \Delta CFB$.

Q24. S and T are points on sides PR and QR of ΔPQR such that $\angle P = \angle RTS$. Show that $\Delta RPQ \sim \Delta RTS$.

Q25. In figure, $\frac{QR}{QS} = \frac{QT}{PR}$ and $\angle 1 = \angle 2$. Show that $\Delta PQS \sim \Delta TQR$.



Q26. Diagonals AC and BD of a trapezium $ABCD$ with $AB \parallel DC$ intersect each other at the point O. Using a similarity criterion for two triangles, show that $\frac{OA}{OC} = \frac{OB}{OD}$.

Q27. D is a point on the side BC a triangle ABC such that $\angle ADC = \angle BAC$. Show that $CA^2 = CB \cdot CD$.

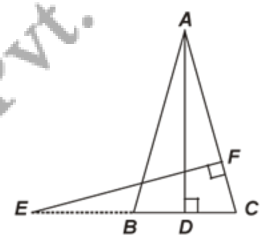
Q28. A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow 28 m long. Find the height of the tower.

Q29. Let $\Delta ABC \sim \Delta DEF$ and their areas be, respectively, 64 cm^2 and 121 cm^2. If $EF = 15.4$ cm find BC.

Q30. Sides of triangles are given below. Determine which of them are right triangles. In case of a right triangle, write the length of its hypotenuse.

(i) 7 cm, 24 cm, 25 cm (ii) 3 cm, 8 cm, 6 cm (iii) 50 cm, 80 cm, 100 cm (iv) 13 cm, 12 cm, 5 cm

Q31. In figure, E is a point on side CB produced of an isosceles triangle ABC with $AB = AC$. If $AD \perp BC$ and $EF \perp AC$, prove that $\Delta ABD \sim \Delta ECF$.



Q32. Two poles of heights 6 m and 11 m stand on a plane ground. If the distance between the feet of the poles is 12 m, find the distance between their tops.

Q33. An aeroplane leaves an airport and flies due north at a speed of 1000 km per hour. At the same time, another aeroplane leaves the same airport and flies due west at a speed of 1200 km per hor. How far apart will be the two planes after $1\frac{1}{2}$ hours?

Q34. A guy wire attached to a vertical pole of height 18 m is 24 m long and has a stake attached to the other end. How far from the base of the pole should the stake be driven so that the wire will be taut?

Q35. A ladder 10 m long reaches a window 8 m above the ground. Find the distance of the foot of the ladder from base of the wall.

Q36. ABC is an equilateral triangle of side $2a$. Find each of its altitudes.

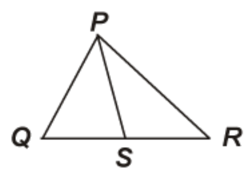
Q37. ABC is an isosceles triangle with $AC = BC$. If $AB^2 = 2AC^2$, prove that ABC is a right triangle.

Q38. ABC is an isosceles triangle right angled at C. Prove that $AB^2 = 2AC^2$.

Q39. PQR is a triangle right angled at P and M is a point on QR such that $PM \perp QR$. Show that $PM^2 = QM \cdot MR$.

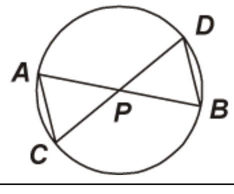
Q40. In figure, PS is the bisector of $\angle QPR$ of ΔPQR. Prove that

$$\frac{QS}{SR} = \frac{PQ}{PR}.$$



Q41. In figure, two chords AB and CD interesect each other at the point P. Prove that:

(i) $\Delta APC \sim \Delta DPB$ (ii) $AP \cdot PB = CP \cdot DP$



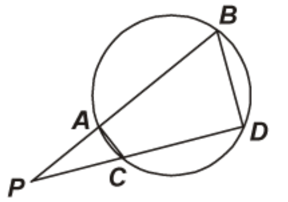
Q42. Fill in the blanks using the correct word given in brackets:

(i) All circles are __________ . (congruent, similar)

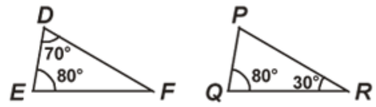
(ii) All squares are __________ . (similar, congruent)

Q43. In figure, two chord AB and CD of a circle intersect each other at the point P (when produced) outside the circle. Prove that

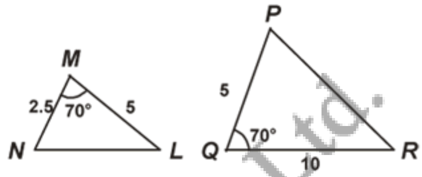
(i) $\Delta PAC \sim \Delta PDB$ (ii) $PA \cdot PB = PC \cdot PD$



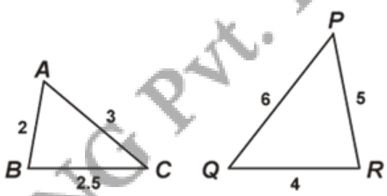
Q44. State which pairs of triangles in figure are similar. Write the similarity criterion used by you for answering the question and also write the pairs of similar triangles in the symbolic form:



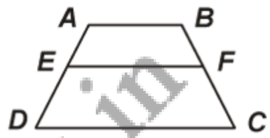
Q45. State which pairs of triangles in figure are similar. Write the similarity criterion used by you for answering the question and also write the pairs of similar triangles in the symbolic form:



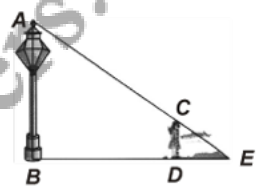
Q46. State which pairs of triangles in figure are similar. Write the similarity criterion used by you for answering the question and also write the pairs of similar triangles in the symbolic form:



Q47. $ABCD$ is a trapezium with AB || DC. E and F are points on non-parallel sides AD and BC respectively such that EF is parallel to AB (see figure). Show that $\frac{AE}{ED} = \frac{BF}{FC}$.

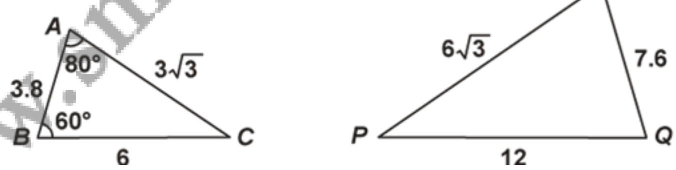


Q48. A girl of height 90 cm is walking away from the base of a lamp-post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds.



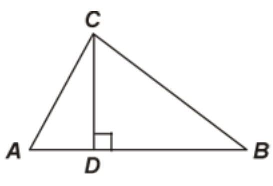
Q49. In figure, $\frac{PS}{SQ} = \frac{PT}{TR}$ and $\angle PST = \angle PRQ$. Prove that PQR is an isosceles triangle.

Q50. Observe figure and then find $\angle P$.

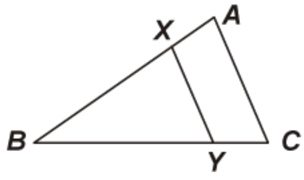


Q51. In figure, $\Delta ACB = 90^\circ$ and $CD \perp AB$. Prove that

$$\frac{BC^2}{AC^2} = \frac{BD}{AD}.$$

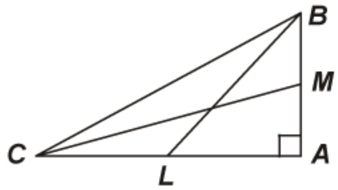


Q52. In figure, the line segment XY is parallel to side AC of ΔABC and it divides the triangle into two parts of equal areas. Find the ratio $\frac{AX}{AB}$.



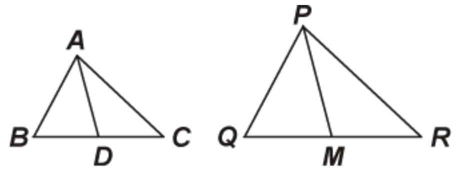
Q53. BL and CM are medians of a triangle ABC right angled at A. Prove that

$$4(BL^2 + CM^2) = 5BC^2.$$



Q54. IF AD and PM are medians of triangles ABC and PQR, respectively where $\Delta ABC \sim \Delta PQR$, prove that $\dfrac{AB}{PQ} = \dfrac{AD}{PM}$.

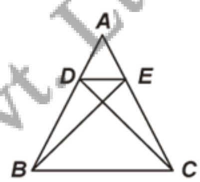
Q55. Sides AB and BC median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of ΔPQR (see figure). Show that $\Delta ABC \sim \Delta PQR$.



Q56. CD and GH are respectively the bisectors of $\angle ACB$ and $\angle EGF$ such that D and H lie on sides AB and FE of ΔABC and ΔEFG respectively. IF $\Delta ABC \sim \Delta FEG$, show that:

(i) $\dfrac{CD}{GH} = \dfrac{AC}{FG}$ (ii) $\Delta DCB \sim \Delta HGE$ (iii) $\Delta DCA \sim \Delta HGF$

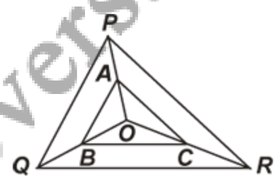
Q57. In figure, if $\Delta ABE \cong \Delta ACD$, show that $\Delta ADE \sim \Delta ABC$.



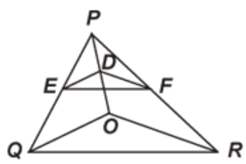
Q58. The diagonals of a quadrilateral $ABCD$ intersect each other at point O such that $\dfrac{AO}{BO} = \dfrac{CO}{DO}$. Show that $ABCD$ is a trapezium.

Q59. $ABCD$ is a trapezium in which $AB \parallel DC$ and its diagonals intersect each other at the point O. Show that $\dfrac{AO}{BO} = \dfrac{CO}{DO}$.

Q60. In figure, A, B and C are points on OP, OQ and OR respectively such that $AB \parallel PQ$ and $AC \parallel PR$. Show that $BC \parallel QR$.

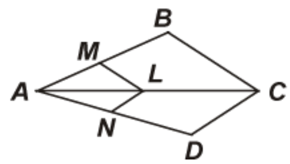


Q61. In figure, $DE \parallel OQ$ and $DF \parallel OR$. Show that $EF \parallel QR$.



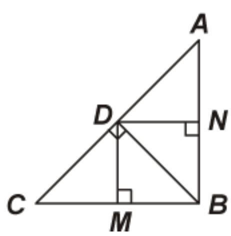
Q62. In figure, if $LM \parallel CB$ and $LN \parallel CD$, prove that

$$\frac{AM}{AB} = \frac{AN}{AD}.$$



Q63. In figure, D is a point of hypotenuse AC of ΔABC, such that $BD \perp AC$, $DM \perp BC$ and $DN \perp AB$. Prove that:

(i) $DM^2 = DN \cdot MC$ (ii) $DN^2 = DM \cdot AN$



Q64. In an equilateral triangle, prove that three times the square of one side is equal to four times the square of one of its altitudes.

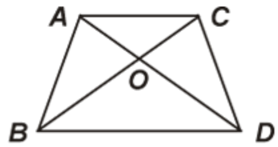
Q65. D and E are points of the sides CA and CB respectively of a triangle ABC right angled at C. Prove that $AE^2 + BD^2 = DE^2 + AB^2$.

Q66. Prove that the area of an equilateral triangle described on one side of square is equal to half the area of the equilateral triangle described on one of its diagonals.

Q67. D, E and F are respectively the mid-points of sides AB, BC and CA of ΔABC. Find the ratio of the areas ΔDEF and ΔABC.

Q68. If the areas of two similar triangles are equal, prove that they are congruent.

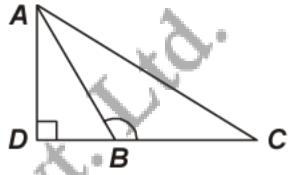
Q69. In figure, ABC and DBC are two triangles on the same base BC. If AD intersects BC at O, show that $\dfrac{\text{ar}(ABC)}{\text{ar}(DBC)} = \dfrac{AO}{DO}$.



Q70. Diagonals of a trapezium $ABCD$ with $AB \parallel DC$ intersect each other at the point O. If $AB = 2CD$. Find the ratio of the areas of triangles AOB and COD.

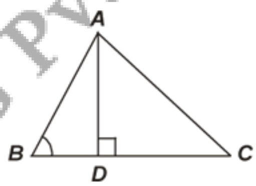
Q71. In figure, ABC is a triangle in which $\angle ABC > 90°$ and $AD \perp CB$ produced. Prove that

$$AC^2 = AB^2 + BC^2 + 2BC \cdot BD.$$

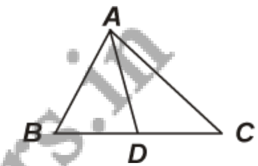


Q72. In figure, ABC is a triangle in which $ABC < 90°$ and $AD \perp BC$. Prove that

$$AC^2 = AB^2 + BC^2 - 2BC \cdot BD.$$



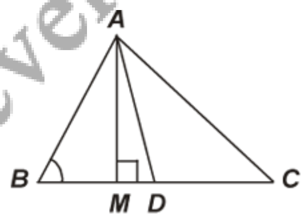
Q73. In figure, D is a point on side BC of ΔABC such that $\dfrac{BD}{CD} = \dfrac{AB}{AC}$. Prove that AD is the bisector of $\angle BAC$.



Q74. In figure, AD is a median of a triangle ABC and $AM \perp BC$. Prove that:

(i) $AC^2 = AD^2 + BC \cdot DM + \left(\dfrac{BC}{2}\right)^2$ (ii) $AB^2 = AD^2 - BC \cdot DM + \left(\dfrac{BC}{2}\right)^2$

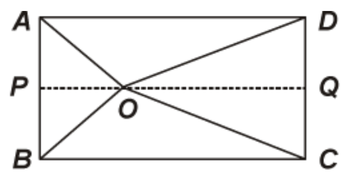
(iii) $AC^2 + AB^2 = 2AD^2 + \dfrac{1}{2} BC^2$



Q75. Prove that the sum of the squares of the diagonals of parallelogram is equal to the sum of the squares of its sides.

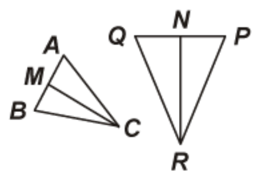
Q76. O is any point inside a rectangle $ABCD$ (see figure). Prove that

$$OB^2 + OD^2 = OA^2 + OC^2.$$



Q77. In figure, CM and RN are respectively the medians of ΔABC and ΔPQR. If $\Delta ABC \sim \Delta PQR$, prove that:

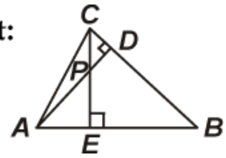
(i) $\Delta AMC \sim \Delta PNR$ (ii) $\dfrac{CM}{RN} = \dfrac{AB}{PQ}$ (iii) $\Delta CMB \sim \Delta RNQ$



Q78. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding medians.

Q79. Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that $\Delta ABC \sim \Delta PQR$.

Q80. In figure, altitudes AD and CE of ΔABC intersect each other at the point P. Show that:

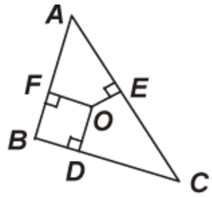


(i) $\Delta AEP \sim \Delta CDP$ (ii) $\Delta ABD \sim \Delta CBE$

(iii) $\Delta AEP \sim \Delta ADB$ (iv) $\Delta PDC \sim \Delta BEC$

Q81. Prove that the sum of the squares of the sides of a rhombus is equal to the sum of the squares of its diagonals.

Q82. In figure, O is a point in the interior of a triangle ABC, $OD \perp BC$, $OE \perp AC$ and $OF \perp AB$. Show that

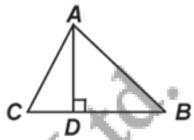


(i) $OA^2 + OB^2 + OC^2 - OD^2 - OE^2 - OF^2 = AF^2 + BD^2 + CE^2$.

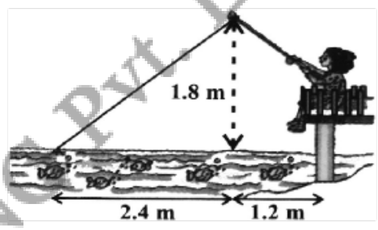
(ii) $AF^2 + BD^2 + CE^2 = AE^2 + CD^2 + BF^2$.

Q83. In an equilateral triangle ABC, D is a point on side BC such that $BD = \frac{1}{3}BC$. Prove that $9AD^2 = 7AB^2$.

Q84. The perpendicular from A on side BC of a ΔABC, intersects BC and D such that $DB = 3CD$ (see figure). Prove that $2AB^2 = 2AC^2 + BC^2$.



Q85. Nazima is fly fishing in a stream. The tip of her fishing rod is 1.8 m above the surface of the water and the fly at the end of the string rests on the water 3.6 m away and 2.4 m from a point directly under the tip of the rod. Assuming that her string (from the tip of her rod does she have out (see figure)? If she pulls in the string at the rates of 5 cm per second, what will be the horizontal distance of the fly from her after 12 seconds.



Date: 29/9/2021

S1. No.

S2. 2 cm

S3. 2.4 cm

S4. No.

S5. Try yourself.

S6. Try yourself.

S7. No.

S8. Try yourself.

S9. No.

S10. Yes.

S11. Yes.

S12. Proved.

S13. Proved.

S14. Length of ladder = 6.5 m.

S15. Proved.

S16. Proved.

S17. Try yourself.

S18. Proved.

S19. Proved.

S20. Proved.

S21. 55°, 55°, 55°.

S22. Proved.

S23. Try yourself.

S24. Try yourself.

S25. Try yourself.

S26. Try yourself.

S27. Try yourself.

S28. 42 m.

S29. 11.2 cm.

S30. (i) Yes. 25 cm (ii) No. (iii) No. (iv) Yes. 13 cm

S31. Proved.

S32. 13 m.

S33. $300\sqrt{61}$ km .

S34. $6\sqrt{7}$ m .

S35. 6 m.

S36. $a\sqrt{3}$.

S37. Proved.

S38. Proved.

S39. Try yourself.

S40. Through R, draw a ine parallel to SP to intersect QP produced at T. Show $PT = PR$.

S41. 3 m, 2.79 m.

S42. (i) Similar (ii) Similar

S43. Proved.

S44. Yes. AA, $\Delta DEF \sim \Delta PQR$

S45. Yes. SAS, $\Delta MNL \sim \Delta QPR$

S46. Yes. SSS, $\Delta ABC \sim \Delta QRP$

S47. Proved.

S48. 1.6 m long.

S49. Proved.

S50. $\angle P = 40°$.

S51. Proved.

S52. $\frac{AX}{AB} = \frac{2-\sqrt{2}}{2}$.

S53. Proved.

S54. Proved.

S55. Try yourself.

S56. Try yourself.

S57. Try yourself.

S58. Try yourself.

S59. Through O, draw a line parallel to DC, intersecting AD and BC at E and F respectively.

S60. Try yourself.

S61. Try yourself.

S62. Proved.

S63. Proved.

S64. Proved.

S65. Proved.

S66. Proved.

S67. 1 : 4.

S68. Proved.

S69. Try yourself.

S70. 4 : 1.

S71. Proved.

S72. Proved.

S73. Proved.

S74. Proved.

S75. **Proved.**

S76. Proved.

S77. Proved.

S78. Proved.

S79. Produce AD to a point E such that $AD = DE$ and produce PM to a point N such that $PM = MN$. Join EC and NR.

S80. Try yourself.

S81. Proved.

S82. Try yourself.

S83. Proved.

S84. Proved.

S85. ****.