



MATHS

BOOKS - V PUBLICATION

SIMILAR TRIANGLES

Question Bank

1. The perpendicular from the square corner of a triangle cuts the Opposite side into two parts of 2 and 3 centimetres

length.' $(##VPU_HSS_MAT_IX_C07_E01_001_Q01##)$ '

i) Prove that the two small triangles cut by the perpendicular have the same angles.

ii) Taking the length-of the perpendicular as 'h', prove that $h^2 = ac$.

iii) Calculate-the perpendicular sides the large triangle.

in) Prove that if the perpendicular from the square comer of a triangle divided the opposite side into parts of lengths a and 'mathbff b' and if the length of the perpendicular is 'h', then $h^2 = ab$.



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2. At two ends of a horizontal line, angles of equal size are drawn, and some points on the slanted lines are joined: '(##VPU_HSS_MAT_IX_C07_E01_002_Q01##)'

- i) Prove that the parts of the horizontal line and parts of the slanted line are in, the same ratio.
- ii) Prove that the two slanted lines at the ends of the horizontal line are also in the same ratio.
- iii) Explain how a line of length 6 centimetres can be divided in the ratio '3: 4' using this.



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3. The midpoint of the bottom side a square is joined to the ends of the top side and extended by the same length. The ends of these lines are joined and perpendiculars are drawn from these points to the bottom side of the square extended: '(##VPU_HSS_MAT_IX_C07_E01_003_Q01##)'

a) Prove that the rilateral obtained thus is also a square.

b) Explain how we can draw a square with two corners on the dlaineter and the others on a sëmicycle, as shown in the picture.



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4. The picture shows a square drawn sharing one corner with a triangle and the other three corners on the sides of this triangle. (##VPU_HSS_MAT_IX_C07_E01_004_Q01##)

i) Calculate the length of a side of the square.

ii) What is the length of a side of the square drawn like this within a triangle of sides 3, 4 and 5 centimetres?



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5. Two poles of heights 3 metres and 2 metres are erected up on the ground and ropes are stretched from the top of each to the foot of the other. (##VPU_HSS_MAT_IX_C07_E01_005_Q01##)

i) At what height above the ground do the ropes cross each other?

ii) Prove that this height would be the same, whatever be the distance between the poles.

ii) Taking the heights of the poles as a and b and height above the ground of the point where the ropes cross each other, as h ,

find the relation between ' \underline{a} , \underline{b} ' and ' h '.



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6. In the figure, ' AP ' and ' BQ ' are perpendicular to ' AB '. Suppose that ' $AP=4$ cm' and ' $BQ=2$ cm'.

Prove that ' $AC:CB=2:1$ '

1"([##VPU_HSS_MAT_IX_C07_E01_006_Q01##](#))'



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7. A boy '1.2' metres tall stands 1 metre away from the foot of a lamp post. If the length of his shadow is '1.5' metres, what is the height of the lamp post?



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8. Prove that $PR = 2$

QS. '(##VPU_HSS_MAT_IX_C07_E01_008_Q01##)'



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9. a) Find the measures of the angles of triangle APB and 'triangle APC'.

b) What is the relation between the sides?

c) Prove that $\angle B = \angle C$

AE' (##VPU_HSS_MAT_IX_C07_E01_009_Q01##)'



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10. In the figure $\angle ADB = \angle BCE$ Prove

that $AB = AC = AD$

AE' (##VPU_HSS_MAT_IX_C07_E01_010_Q01##)'



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11. In the figure, ' $\angle ADB = \angle BCD$ '. Prove that $AB = AC$.

2" (##VPU_HSS_MAT_IX_C07_E01_011_Q01##)



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12. In the figure, ' $\angle A = \angle D$ '. Prove that $PA = PD$.

PD' (##VPU_HSS_MAT_IX_C07_E01_012_Q01##)



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13. Draw a triangle of angles the same as those of the triangle shown and sides scaled by $\frac{1}{14}$.
14' (##VPU_HSS_MAT_IX_C07_E02_001_Q01##)



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14. See this picture of a scalene triangle.

1) Draw a scalene triangle with angles the same as those of this one and sides scaled by $\frac{1}{12}$.

2) Draw a scalene triangle with angles different from those of this and sides scaled by $\frac{1}{12}$.
12" (##VPU_HSS_MAT_IX_C07_E02_002_Q01##)



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15. Draw a rilateral with angles the same as those of this one and the sides scaled by '12'('##VPU_HSS_MAT_IX_C07_E02_003_Q01_Q01##')



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16. The picture shows two circles with the same centre and two triangles formed by joining the centre to the. points of Intersection of the circles with two radii of the larger circle:

'(##VPU_HSS_MAT_IX_C07_E03_001_Q01##)' Prove that these 'triangles are similar.



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17. The lines joining the circumcentre of a triangle to the vertices are extended to meet another circle with the same centre, and these points are joined to make another triangle.

'(##VPU_HSS_MAT_IX_C07_E03_002_Q01##)' i)

Prove that the two triangles are similar,

ii). Prove that the scale factor of the sides of the

triangle is the scale factor of the radii of the circles.



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18. A point inside a quadrilateral is joined to its vertices and the lines are extended by the same scale factor. Their ends are joined to make another quadrilateral.

'(##VPU_HSS_MAT_IX_C07_E03_003_Q01##)' i).

Prove that the sides of the two quadrilaterals are scaled by the same factor.

ii) Prove that the angles of the two quadrilaterals are the same.



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19. Triangle ABC' and 'triangle PQR' 'are similar triangles. If 'AB=6 cm, BC=7 cm, PQ=9 cm','PR=6 cm', find other sides of the triangles.



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20. In the figure 'A D' is parallel to 'B D' and 'A B' is parallel to DE. Prove that 'triangle A B C' and 'triangle E D' A are similar triangles.'
(##VPU_HSS_MAT_IX_C07_E03_005_Q01##)



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21. In 'triangle A B C, P' is any point in 'B C_i D, E, F' are midpoints of 'BP, AP', CP respectively. Prove.that 'triangle A B C' and 'triangle D E F' are similar.'
(##VPU_HSS_MAT_IX_C07_E03_006_Q01##)



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22. In the figure AB is parallel to PQ. BC is parallel to BR. Prove that $\angle A = \angle P$ and $\angle C = \angle R$.



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23. Triangle ABC is a right angled triangle with $\angle B = 90^\circ$. The altitude through B meets AC at D. Prove that the three triangles 'triangle ABC, triangle ADB, triangle BCD' are similar.



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24. In the figure 'B C'. is parallel to 'D E'. 'A B=6
~cm, BD=3 ~cm'

a) '(##VPU_HSS_MAT_IX_C07_E04_001_Q##)'What
is the length of AD? b) If 'BC=4 cm', what is DE?

(c) What is the ratio of the perimeters of the
triangles 'ABC' and ADE?

d) 'cdot A B=5 ~cm_j AC^prime=4 ~cm, angle
A=30^(circ) .' Draw the. triangle ABC and draw a
triangle whose perimeter_is '11^1 /_2' xx the
perimeter of ABC. " (Annual 2019)



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25. In the figure, $\angle A = \angle P$, $\angle B = \angle Q$, $AB = 9$ centimetres, $AC = 10$ centimetres, $PR = 20$ centimetres,

a) What is the length of PQ ?

b) If the perimeter of triangle ABC is 30 centimetres, what is the perimeter of triangle PQR ?

c) If area of triangle ABC is $30\sqrt{2}$ square centimetres. What is the area of triangle PQR ?



26. In the figure, 'O' is the centre of the circle.

' $\angle P = \angle R = 90^\circ$ ', $OP = 2$ centi- metres.

$PR = RB$.

a) What is the measure of ' $\angle B$ ' ?

b) What is the length of 'BC' ?

c) Find the length of 'QR'.

'(##VPU_HSS_MAT_IX_C07_E04_003_Q01##)'



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27. In the figure, $\angle ABC = \angle APC$

$\angle B = 90^\circ$!

a). How many triangles are there in the figure?

Which are they?

b) Prove that these triangles are

similar. (VPU_HSS_MAT_IX_C07_E04_004_Q01)



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28. In the figure $\angle B = \angle D = 90^\circ$, angle

$\angle BFE = 65^\circ$

a) What is the measure of $\angle DFC$?

b) Prove that $\angle E = \angle D = \angle C$ and $AE = 3$ cm.

'(##VPU_HSS_MAT_IX_C07_E04_005##)'



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29. In the figure $\angle B = \angle D = \angle C$ and $\angle A = 90^\circ$. $BC = 4$ cm and $ED = 3$ cm.

a) What is the length of EC ?

b) If $\angle ECD = x^\circ$ find $\angle ACB$,

c) Find the lengths of AE .

d) $CE : AC : AE =$ _____

'(##VPU_HSS_MAT_IX_C07_E04_006_Q01##)'



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30. 'A B' is the diameter of the circle. 'C D' is a chord perpendicular to 'AB, angle A=angle D'.

a) Write another pair of equal angles in the figure.

b) If 'P C=6' centimetres, what is the length of D?

c) Prove that 'PA cdot x PB=PC^2'

d) If 'P A=9' centimetres, 'P C=6' centimetres, what is the length of 'PB' ?

'(##VPU_HSS_MAT_IX_C07_E04_007_Q01##)'



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31. In quadrilateral ABCD, $AB=4$ centimetres, $BC=3$ centimetres, $CD=2$ centimetres, $AD=2$ centimetres, $AC=3$ centimetres. Draw quadrilateral ABCD. Draw another quadrilateral with same angles and sides two times as that of ABCD.

(VPU_HSS_MAT_IX_C07_E04_008_Q01)



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32. In the figure, $\angle ADB = \angle BCD$. Prove that $AB \times AC = AD^2$.

'(##VPU_HSS_MAT_IX_C07_E04_009_Q01##)'



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33. In the figure

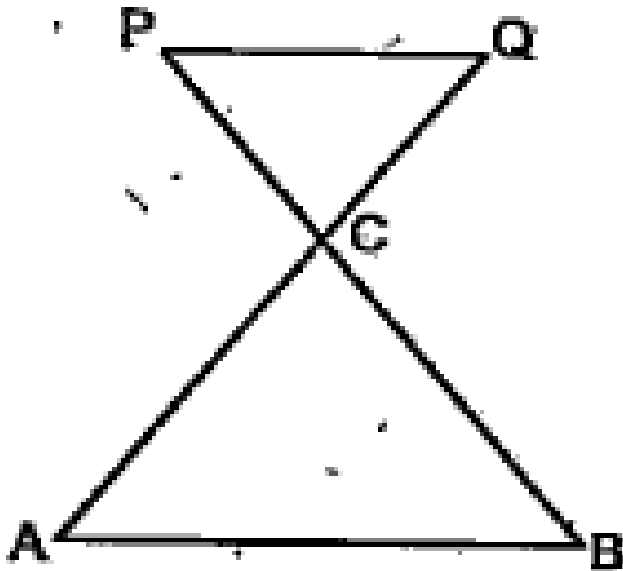
a) How many times the sides of the large triangle is longer than that of the small triangle?

b) Write the angles of two triangles which are equal.

'(##VPU_HSS_MAT_IX_C07_E04_010_Q01##)'



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34.

In the figure, the sides AC and BC are extended to the points 'Q' and 'P' respectively- If $\angle A = \angle P$

a) Write the equal angles of triangles ABC and 'PQC'.

b) Prove that $AC \times QC = BC \times PC$



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35. In the figure, the sides of triangle 'ABC' are 5 centimetres, 6 centimetres and the sides of trianglePQR are 10 centimetre, 12 centimetres and 14 centimetres.

'(##VPU_HSS_MAT_IX_C07_E04_012_Q01##)'

- a) If ' $\angle B = x^\circ$ ', find ' $\angle Q$ '.
- b) The perpendicular from A to BC is AD and the perpendicular from 'P' to 'QR' is PS. Write the measures of angles of 'triangle ABD and PQS.
- c) How many times of AD is PS?

d) How many times the area of triangle 'A B C' is the area of triangle PQR?



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36. In triangle 'ABC, angle B=90 degree and 'BD' is perpendicular to AC.

a) If 'angle A=x degree, write the angles of triangles 'ABD' 'and 'BDC'.

b) Prove that ' $(BD)^2 = AD \times CD$ '.



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37. In the figure, the lines 'A B' and 'C D' Intersect at the point 'P'. Prove that length of 'PB' is a third of the length of AP.

'(##VPU_HSS_MAT_IX_C07_E04_014_Q01##)'



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38. In the figure, the line 'D B' extended and the perpendicular to 'BC' at 'C' meets at E.

i) Prove that the triangles 'ADB' and 'CBE' have the same angles.

if) Compute the length of CE.

'(##VPU_HSS_MAT_IX_C07_E04_015_Q01##)'



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39. a) Find out the angles of the triangles APC and BPC in the figure.

'(##VPU_HSS_MAT_IX_C07_E04_016_Q01##)'

b) What is the relation between the sides of these triangles?

c) Prove that $AP \times BP = CP^2$.



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40. PQR and XVZ are. angled triangles and 'O
Q=8' centimetre.

1) Find- 'angle P' and 'angle X_i'.

2) If 'Y Z' is '1 12' xx of 'P Q', find all sides of "
triangle XYZ. (Second term 2017)



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41. A point 'O' inside the hexagon ABCDEF is
joined to its vertices and those line are extended
'1_22^1' xx. Their ends are joined to make another
hexagon PQRSTU.

'(##VPU_HSS_MAT_IX_C07_E04_018_Q01##)'

i) Prove that the angles of the two hexagons are same.

ii) Prove that the length of sides of the bigger hexagon is '12' times the length. of sides of the smaller hexagon.



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42. (##VPU_HSS_MAT_IX_C07_E04_019_Q01##)'

a) Write the measure of 'angle A'.

b) Find the length of 'PQ'.



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43. Prove that 'P R=2 Q S'

'(##VPU_HSS_MAT_IX_C07_E04_020_Q01##)'



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44. (##VPU_HSS_MAT_IX_C07_E04_021_Q01##)'

In the figure 'P Q' is parallel to 'B C' and 'P R' is parallel to 'CD'.

a) Write, the equal angles of triangle 'AQP', and

ABC.

b) Write the equal angles of triangles ARP and

'ADC'.

c) Prove that $\angle A = \angle QAB$



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45. In triangle 'ABC, angle B=90 degree . BD' is perpendicular to 'AC'.

a) If 'angle A=x degree', find the measures of 'angle C' and 'angle ABD'

b) Write the ratios of the sides opposite to the equal angles in triangle 'ABD' and triangle ABC.

c) Prove that $AB^2 = AD \times AC$.



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46. In the figure, 'ABC' is a triangle and 'PQRB' is a square. 'PA=12 cm' and 'RC=3 cm'. Find the area of the square.

'(##VPU_HSS_MAT_IX_C07_E04_023_Q01##)'



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