



MATHS

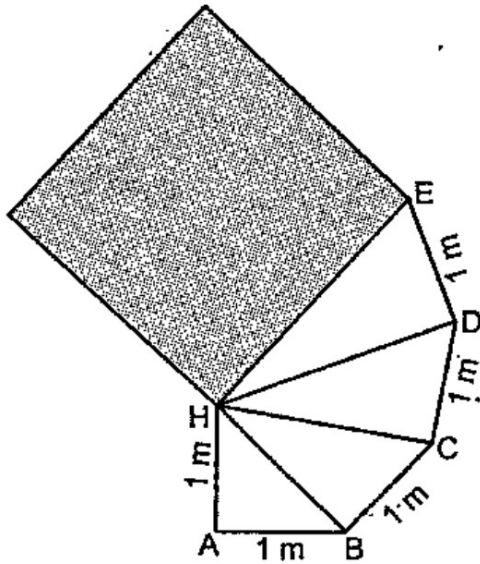
BOOKS - V PUBLICATION

New Numbers

Question Bank

1. In the picture, the square on the hypotenuse of the top most right triangle is drawn. Calculate the area and the length of a side of

the square.



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2. A square is drawn on the altitude of an equilateral triangle of side 2 metres.

a) What is the area of the square?

b) What is the altitude of the triangle



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3. We have seen In Class 8 that any odd number can be written as the difference of two perfect squares. Using this, draw squares of areas 7 and 11 square centimetres.



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4. Explain two different methods of drawing a square of area 13 centimetres:



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5. Find three fractions larger than $\sqrt{2}$ and less than $\sqrt{3}$.



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6. a) Draw the square ABCD of area 9 square centimetres.

b) Draw the diagonal AC of the square. Draw a square with AC as side.

c) How much is the area of this new square?

Calculate its perimeter also, :



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7. A square is drawn on the altitude of an equilateral triangle of side 4 cm.

a) What is the altitude of the triangle?

b) What is the area and perimeter of the square?



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8. Draw a square of area 19 sq.cm



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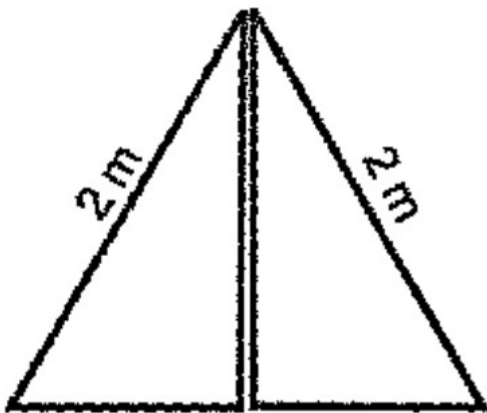
9. The hypotenuse of a right triangle is $1\frac{1}{2}$ meters and another side is $\frac{1}{2}$ meter. Calculate

its perimeter correct to a centimeter.

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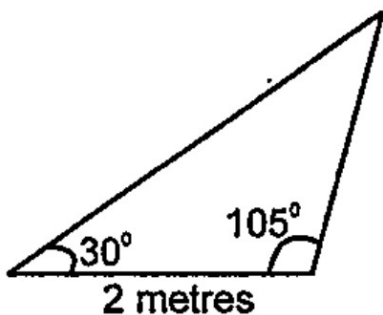
10. The picture shows an equilateral triangle cut into halves by a line through a vertex.

What is the perimeter of a part?



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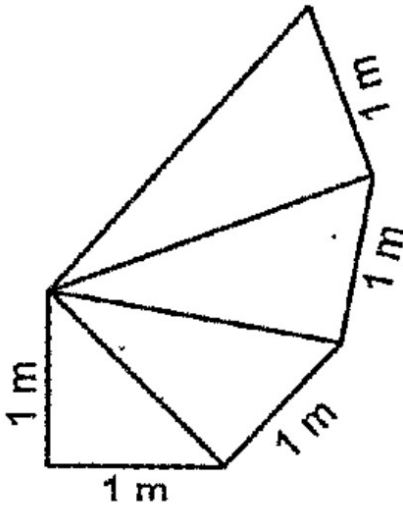
11. Calculate the perimeter of the triangle shown below.



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12. We have seen how we can draw a series of right triangles as in the picture.

How much more is the perimeter of the 10th triangle than the perimeter of the ninth triangle?



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13. What is the hypotenuse of the right triangle with perpendicular sides $\sqrt{2}$ centimeters and $\sqrt{3}$ centimeters? How much larger than the hypotenuse is the sum of the perpendicular sides?



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14. Simplify

a) $\sqrt{18} + \sqrt{50}$ b) $\sqrt{2} + \sqrt{32} + \sqrt{512}$

c) $\sqrt{48} - \sqrt{27}$





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15. A rhombus with one side-3 meters and one angle 60° is given in the picture. Find the sum of the length of its diagonals



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16. In the figure, a side of the triangle is 12 centimetres and the angle at its ends are 45° and 60°

i) Find the length of the other two sides of the

triangle.

ii) Find the perimeter of this triangle.



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17. Of four equal equilateral triangles, two are cut vertically into halves and two whole are put together to make a rectangle:

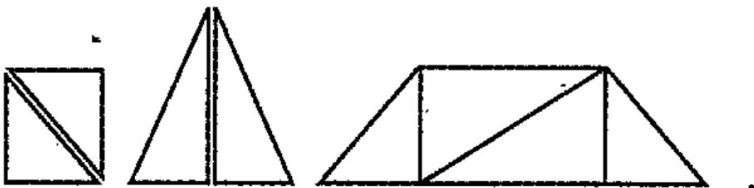
If a side of the triangle is 1 metre, what is the area and the perimeter of the rectangle?



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18. A square and equilateral triangle of sides twice as long we cut and the pieces are rearranged to form a trapezium, as shown below.

If a side of the square is 2 centimetres, what are the perimeter and area of the trapezium?



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19. Calculate the perimeter and area of the triangle in the picture.



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20. From the pairs of numbers given below, pick out those whose product is a natural number or a fraction.

i) $\sqrt{3}, \sqrt{12}$

ii) $\sqrt{3}, \sqrt{1.2}$

iii) $\sqrt{5}, \sqrt{8}$

iv) $\sqrt{0.5}, \sqrt{8}$



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21. Compute the perimeter of the quadrilateral with measures as given in the figure, correct to centimetres.



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22. The hypotenuse of a right triangle is $1\frac{1}{2}$ metres and another side is $\frac{1}{2}$ metre. Calculate its perimeter correct to a centimetre.



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23. Area of a square is 3 square metres.

a) Find the length of a side.

b) What is the perimeter?



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24. Simplify

a) $\sqrt{24} \sqrt{6}$ b) $\sqrt{7} \sqrt{4} \sqrt{8}$ c) $\sqrt{21} \sqrt{15} \sqrt{35}$ d)

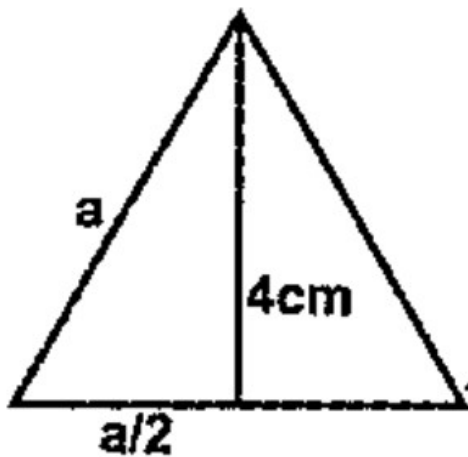
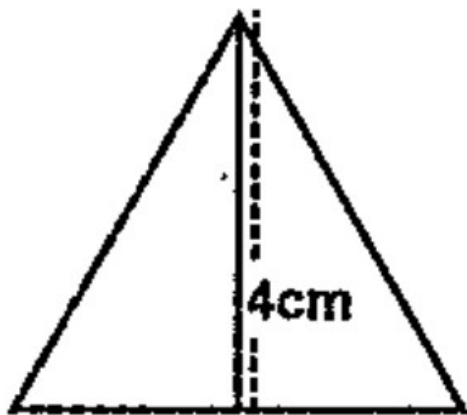
$\sqrt{242} \sqrt{12} \sqrt{6}$



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25. Calculate the length of the sides of the equilateral triangle on the right correct to a

millimeter.



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26. Prove that $(\sqrt{2} + 1)(\sqrt{2} - 1) = 1$. Use this to compute $\frac{1}{\sqrt{2} - 1}$. Correct two decimal places.



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27. Compute $\frac{1}{\sqrt{2} + 1}$ correct two decimal places.



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28. Simplify

$$(\sqrt{3} - \sqrt{2})(\sqrt{3} + \sqrt{2})$$

Using this compute

$$\frac{1}{\sqrt{3} - \sqrt{2}} \text{ and } \frac{1}{\sqrt{3} + \sqrt{2}}.$$



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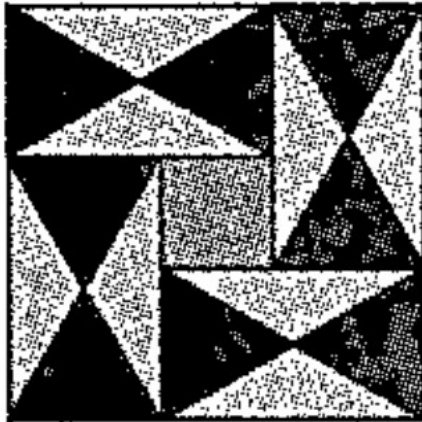
29. Prove that $\sqrt[2]{2^3} = 2 \sqrt[2]{2}$ and $\sqrt[3]{3^8} = 3 \sqrt[3]{3}$. Can you find other numbers like this?



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30. All black triangles in the picture are equilateral.

What is the ratio of sides of the outer and inner squares?



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31. Using $\sqrt{3} = 1.73$, find $\frac{\sqrt{3}}{4}$ correct to three decimals.



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32. Using $\sqrt{10} = 3.162$, compute $\frac{1}{\sqrt{10}}$ correct to three decimals.



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33. Using $\sqrt{6} = 2.449$, calculate $\sqrt{\frac{2}{3}} + \sqrt{\frac{3}{2}}$

correct to three decimals.



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34. Compute $\sqrt{12} - \sqrt{3}$ upto two decimals.



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35. Given $\sqrt{2} = 1.414$, find the approximate value of $\frac{3}{\sqrt{2}}$ to three decimal places.



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36. Using $\sqrt{2} \approx 1.414$, $\sqrt{3} = 1.732$.

Calculate the value of the following



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37. In the picture A B C is an equilateral triangle. $BC = 5\text{cm}$. Find the area of triangle BCD.



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38. In the figure, angle $B=120^\circ$, angle $A=15^\circ$, $AB=10$ centimeters. Also distance from A to BC is AP .

- Write the angle measures of triangle APB .
- Find the lengths of AP , PB .
- Calculate the area of triangle ABC .



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39. a) $\sqrt{3} \sqrt{3} =$

b) What is the product of $(\sqrt{3} + \sqrt{2})$ and $(\sqrt{3} - \sqrt{2})$

c) What is the reciprocal of $\sqrt{3} + \sqrt{2}$?



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40. In the figure, angle $A=30^\circ$, angle $B=90^\circ$, $AC=16\text{cm}$

(a) What is the length of BC?

b) What is the length of AB ?



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41. a) $\sqrt{7}\sqrt{7} =$

b) $\sqrt{7} + \sqrt{7} =$



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42. a) Find the area and perimeter of the rectangle in the figure.

b) What is the length of AC ?



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43. $(\sqrt{3} + \sqrt{2})(\sqrt{3} - \sqrt{2}) = (\sqrt{3})^2 - (\sqrt{2})^2 = 3 - 2 = 1$ Using this, find the approximate values of $\frac{1}{\sqrt{3} + \sqrt{2}}$ and $\frac{1}{\sqrt{3} - \sqrt{2}}$

correct to two decimal: places. ($\sqrt{3} \approx 1.732$, $\sqrt{2} \approx 1.414$)



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44. In the figure, angle $B = \text{angle } ACD = 90^\circ$

a) What is the length of AC?

b) Find the length of AD.

c) How much more is the perimeter of triangle ACD than the perimeter of triangle ABC?



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45. Compute the following $(14+\sqrt{3})(14-\sqrt{3})$



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46. Find the value of $\sqrt{243} + \sqrt{300}$



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47. If $\sqrt{3} = 1.732$ and $\sqrt{5} = 2.236$, compute $\sqrt{5} + \sqrt{3}$
correct two decimal places:



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48. Calculate the perimeter and area of the triangle in the picture.



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49. Compute $\sqrt{12} - \sqrt{3}$ upto two decimals.



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50. In the figure, angle $B=120^\circ$ angle $A=15^\circ$,
 $AB=10$ centimetres. Also distance from A to BC
is AP.

a) Write the angle measures of triangle APB.

b) Find the lengths of AP, PB.

c) Calculate the area of triangle A B C.



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51. The pictures shows a tangram of 7 pieces
made by cutting a square of side 4

centimetres. Calculate the length of the sides of each piece.



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52. Draw an equilateral triangle with side $\sqrt{10}$ centimetres.



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