CLASS VIII – MATHEMATICS

Chapter Test: The Baudhāyana-Pythagoras Theorem

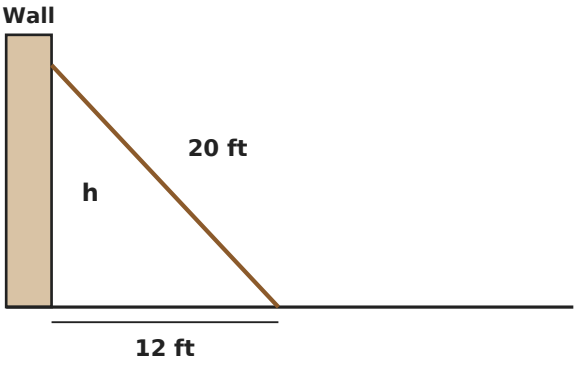
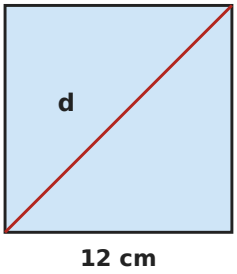
(Ganita Prakash, Grade 8, Part II – Chapter 2)

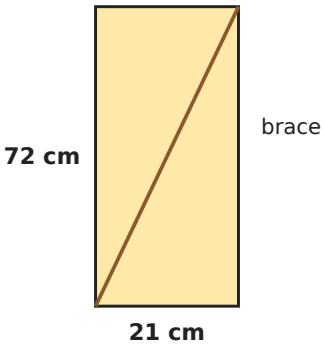
Time: 1½ Hours **M. M.: 40**

General Instructions:

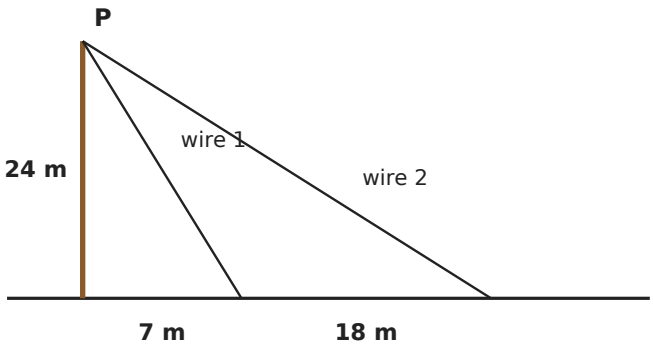
1. This paper contains 20 questions. All questions are compulsory.
2. This paper is divided into 4 sections: **A, B, C** and **D**.
3. In **Section A**, Questions no. 1 to 10 are Multiple Choice Questions carrying 1 mark each.
4. In **Section B**, Questions no. 11 to 13 are Very Short Answer type questions carrying 2 marks each.
5. In **Section C**, Questions no. 14 to 17 are Short Answer type questions carrying 3 marks each.
6. In **Section D**, Questions no. 18 to 20 are Long Answer / Case-based questions carrying 4 marks each.
7. There is no overall choice. However, an internal choice has been provided in 1 question of Section B, 3 questions of Section C and 2 questions of Section D.
8. Figures are only for reference and are not drawn to scale. Questions 9, 10, 11, 14 and 18 are figure-based.
9. Show all the steps of your working.
10. Use of calculator is **not** allowed.

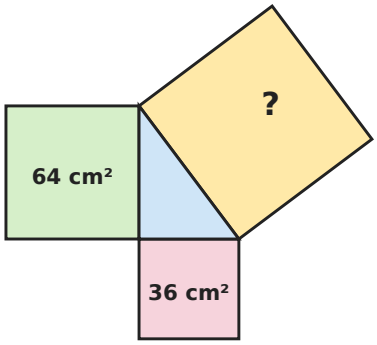
Q. No.	Section – A	Marks
1	The hypotenuse of a right triangle whose shorter sides are 9 cm and 12 cm is (A) 13 cm (B) 14 cm (C) 15 cm (D) 21 cm	**[1]**
2	Which of the following is a primitive Baudhāyana triple? (A) (9, 12, 15) (B) (12, 35, 37) (C) (6, 8, 10) (D) (15, 20, 25)	**[1]**
3	Which of the following is a Baudhāyana triple? (A) (20, 21, 29) (B) (20, 21, 31) (C) (20, 22, 29) (D) (21, 22, 29)	**[1]**
4	The hypotenuse of a right triangle is 26 cm and one of its sides is 10 cm. The other side is (A) 16 cm (B) 20 cm (C) 22 cm (D) 24 cm	**[1]**
5	√50 lies between the whole numbers (A) 5 and 6 (B) 6 and 7 (C) 7 and 8 (D) 8 and 9	**[1]**
6	The sum of the first 12 odd numbers is (A) 121 (B) 144 (C) 156 (D) 24	**[1]**
7	Which of the following is a scaled version of the Baudhāyana triple (5, 12, 13)? (A) (10, 24, 26) (B) (10, 24, 27) (C) (15, 36, 38) (D) (10, 25, 26)	**[1]**
8	The diagonal of a rectangle of length 30 cm and breadth 16 cm is (A) 32 cm (B) 36 cm (C) 46 cm (D) 34 cm	**[1]**

Q. No.	Section – A	Marks
9	In Fig. 1, a 20 ft ladder rests against a vertical wall with its foot 12 ft from the wall. The height h at which the ladder touches the wall is  Fig. 1: A ladder resting against a wall (A) 8 ft (B) 14 ft (C) 16 ft (D) 32 ft	**[1]**
10	A square of side 12 cm is shown in Fig. 2. The area of the square drawn on its diagonal d is  d = diagonal Fig. 2: A square of side 12 cm (A) 144 cm^2 (B) 288 cm^2 (C) 24 cm^2 (D) 576 cm^2	**[1]**

Q. No.	Section – B	Marks
11	A rectangular wooden board of width 21 cm and length 72 cm is strengthened with a diagonal brace (Fig. 3).  Fig. 3: A rectangular board with a diagonal brace (i) Find the length of the brace. [1] (ii) A strip of length 1 m is available. How much of it is left over after cutting the brace? [1]	**[2]**

Q. No.	Section – B	Marks
12	(A) Is a triangle with sides 28 cm, 45 cm and 53 cm a right-angled triangle? Give a reason. **OR** (B) The hypotenuse of an isosceles right triangle is √98 cm. Find the length of each of its equal sides.	**[2]**
13	Find the length of the diagonal of a square of side 9 cm. Between which two consecutive whole numbers does it lie?	**[2]**

Q. No.	Section – C	Marks
14	A vertical pole PQ of height 24 m is supported by two wires fixed to the ground at points 7 m and 18 m from its foot Q, as shown in Fig. 4.  Fig. 4: A pole held by two wires (i) Find the length of wire 1. [1] (ii) Find the length of wire 2. [1] (iii) Which wire is longer and by how much? [1]	**[3]**
15	(A) Using the fact that $(n-1)^2 + (2n-1) = n^2$, find the Baudhāyana triple generated by the odd square 49. **OR** (B) Using the fact that $(n-1)^2 + (2n-1) = n^2$, find the Baudhāyana triple generated by the odd square 81.	**[3]**
16	(A) The diagonals of a rhombus are 18 cm and 80 cm. Find the length of its side and its perimeter. **OR** (B) An equilateral triangle has sides of 10 cm. Show that its altitude bisects the base, find the square of the altitude and state between which two consecutive whole numbers the altitude lies.	**[3]**
17	(A) Using squares of numbers, show that $1.41 < \sqrt{2} < 1.42$. **OR** (B) Show that (20, 21, 29) is a primitive Baudhāyana triple. Write its scaled version for k = 2 and verify that it is also a Baudhāyana triple.	**[3]**

Q. No.	Section – D	Marks
18	(A) Fig. 5 shows squares drawn on the three sides of a right-angled triangle. The squares on the two shorter sides have areas 36 cm² and 64 cm².  Fig. 5: Squares drawn on the three sides of a right triangle (i) Find the lengths of the two shorter sides. [1] (ii) Find the area of the square on the hypotenuse. [1] (iii) Find the length of the hypotenuse. [1] (iv) Find the perimeter of the triangle. [1] **OR** (B) A ship sails 24 km north and then 10 km east. (i) How far is it from its starting point? [2] (ii) If it had sailed 32 km north instead of 24 km (and then 10 km east), between which two consecutive whole numbers would its distance from the start lie? [2]	**[4]**
19	(A) A reed stands in a pond with its tip 2 units above the water. When it is pulled aside, the tip just touches the water 6 units from its original position. Let x be the depth of the pond. (i) Write the length of the reed in terms of x. [1] (ii) Form an equation using the Baudhāyana-Pythagoras Theorem. [1] (iii) Solve it to find the depth of the pond. [1] (iv) Find the total length of the reed. [1] **OR** (B) (i) Prove that $(2m)^2 + (m^2 - 1)^2 = (m^2 + 1)^2$. [2] (ii) Use it to write the Baudhāyana triple for m = 6. [1] (iii) Verify that it satisfies $a^2 + b^2 = c^2$. [1]	**[4]**
20	**Case Study:** The school has a rectangular playground 48 m long and 55 m wide. Students walk across it along its diagonal to save time. (i) Find the length of the diagonal path. [1] (ii) How much shorter is the diagonal path than walking along two sides? [1] (iii) A 20 m tall flagpole at the corner is to be fixed with a wire to a point 21 m from its foot. Find the length of the wire. [1] (iv) A square flower bed has side 10 m. Between which two consecutive whole numbers does the length of its diagonal lie? [1]	**[4]**

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