The Baudhayana–Pythagoras Theorem

Standard difficulty · 20 questions · 40 marks · Time: 28 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. A right-angled triangle has legs 36 cm and 15 cm. Its hypotenuse is:
(a) 40 cm **(b)** 51 cm **(c)** 21 cm **(d)** 39 cm

2. A right-angled triangle has hypotenuse 65 cm and one leg 56 cm. The other leg is:
(a) 9 cm **(b)** 121 cm **(c)** 33 cm **(d)** 34 cm

3. In a right-angled triangle, the square on the hypotenuse equals:
(a) twice the other sides
(b) the difference of the other two squares
(c) the product of the other two sides
(d) the sum of the squares on the other two sides

4. Is a triangle with sides 20, 48 and 53 right-angled?
(a) You must measure the angles **(b)** Yes
(c) No **(d)** Only if two sides are equal

5. Which of these is a Pythagorean triple?
(a) 40, 42, 57 **(b)** 35, 12, 36 **(c)** 42, 40, 58 **(d)** 15, 36, 38

6. A rectangle is 24 m by 70 m. Its diagonal is:
(a) 74 m **(b)** 94 m **(c)** 188 m **(d)** 76 m

7. A right triangle has legs 6 and 8. The hypotenuse is:
(a) 48 **(b)** 12 **(c)** 14 **(d)** 10

8. Squares are drawn on the two legs of a right triangle, with areas 225 cm^2 and 64 cm^2. The square on the hypotenuse has area:
(a) 529 cm^2 **(b)** 161 cm^2 **(c)** 120 cm^2 **(d)** 289 cm^2

Section B — Short answer — 8 × 2 = 16 marks

9. Find the hypotenuse of a right-angled triangle whose legs are 28 cm and 45 cm.

10. A right-angled triangle has hypotenuse 25 m and one leg 7 m. Find the other leg.

11. Check whether 45 cm, 30 cm and 53 cm can be the sides of a right-angled triangle.

12. Use m = 5 and n = 4 in $(m^2 - n^2, 2mn, m^2 + n^2)$ to make a Pythagorean triple, and check it.

13. A ladder 29 m long leans against a wall with its foot 21 m from the wall. How high up the wall does it reach?

14. A square has side 14 cm. Its diagonal is $\sqrt{392}$ cm. Between which two whole numbers does the diagonal lie?

15. A rectangle has a diagonal of 41 cm and one side of 9 cm. Find the other side and the area.

16. On squared paper, point A is at (9, 10) and point B is 20 units to the right and 21 units up from A. How far apart are A and B?

Section C — Word problems — 4 × 4 = 16 marks

17. Vikram leans a 29 m ladder against a wall so that it reaches 21 m up. How far from the wall is its foot? If the foot is moved closer so the ladder reaches higher, which length stays the same?

18. A pole 40 m tall casts a shadow 9 m long on flat ground. How far is it from the top of the pole to the tip of the shadow?

19. Rohan cycles 35 km east and then 12 km north. How far is Rohan from the starting point in a straight line, and how much shorter is that than the road travelled?

20. A screen is 72 inches wide and 30 inches high. Screen sizes are given by the diagonal. What size is this screen?

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Answer key

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Q	Answer	Working
1	**(d) 39 cm**	$36^2 + 15^2 = 1521 = 39^2$
2	**(c) 33 cm**	$65^2 - 56^2 = 1089 = 33^2$
3	**(d) the sum of the squares on the other two sides**	—
4	**(c) No**	$20^2 + 48^2 = 2704$; $53^2 = 2809$
5	**(c) 42, 40, 58**	$42^2 + 40^2 = 58^2$
6	**(a) 74 m**	$\sqrt{(24^2 + 70^2)} = 74$
7	**(d) 10**	$36 + 64 = 100$
8	**(d) 289 cm^2**	the square on the hypotenuse is the sum of the other two
9	**53 cm**	$\sqrt{(784 + 2025)} = \sqrt{2809} = 53$
10	**24 m**	$\sqrt{(625 - 49)} = \sqrt{576} = 24$
11	**No**	$30^2 + 45^2 = 2925$; $53^2 = 2809$
12	**9, 40, 41**	$9^2 + 40^2 = 1681 = 41^2$
13	**20 m**	$\sqrt{(841 - 441)} = 20$
14	**19 and 20**	$19^2 = 361 < 392 < 400 = 20^2$
15	**40 cm; 360 cm^2**	$\sqrt{(1681 - 81)} = 40$
16	**29 units**	$\sqrt{(20^2 + 21^2)} = 29$
17	**20 m; the ladder's length (29 m)**	$\sqrt{(841 - 441)} = 20$
18	**41 m**	$40^2 + 9^2 = 41^2$
19	**37 km; 10 km shorter**	$\sqrt{(35^2 + 12^2)} = 37$; $47 - 37$
20	**78 inches**	$72^2 + 30^2 = 6084 = 78^2$