Year 8 Worksheet 3: Pythagoras's theorem

Question 1: Answer the following.

1	In a right triangle, which side is the longest and opposite the right angle? A. Hypotenuse B. Adjacent side C. Opposite side D. Base
2	What is Pythagoras's theorem used for? A. Calculating the area of a circle B. Finding the missing side in a right triangle C. Determining the volume of a rectangular prism D. Measuring the angles of a triangle
3	What is Pythagoras's theorem equation? A. $a^2 = b^2 + c^2$ B. $a^2 = b^2 - c^2$ C. $a^2 + b^2 = c^2$ D. $a^2 - b^2 = c^2$
4	In a right triangle, if one of the shorter sides is 6 units long and the hypotenuse is 10 units long, what is the length of the other shorter side? A. 8 units B. 4 units C. 9 units D. 5 units

5	If the sides of a triangle have lengths 15 cm, 9 cm, and 12 cm, is the triangle a right triangle? A. Yes B. No
6	If the lengths of the two shorter sides of a right triangle are 3 cm and 4 cm, what is the length of the hypotenuse? A. 7 cm B. 5 cm C. 12 cm D. 9 cm
7	If one side of a right triangle is 5 cm and the other side is 12 cm, what is the length of the hypotenuse? A. 17 cm B. 13 cm C. 8 cm D. 15 cm
8	Which of the following sets of numbers could represent the sides of a right triangle? A. 3, 4, 5 B. 2, 5, 9 C. 6, 8, 10 D. 7, 12, 15
9	In a right triangle, if the lengths of the two shorter sides are 15 units and 8 units, what is the length of the hypotenuse? A. 13 units B. 20 units C. 17 units D. 25 units
10	If the hypotenuse of a right triangle is 40 cm and one of the shorter sides is 9 cm, what is the length of the other shorter side? A. 58 cm B. 56 cm C. 45cm D. 41cm

Question 2: Answer the following.

1	A right triangle has one side measuring 8 cm and another side measuring 15 cm. What is the length of the hypotenuse?
2	John is building a ramp for his skateboard. The length of the ramp is 5 meters, and the height it needs to reach is 4 meters. How far away from the base of the wall should John place the ramp to ensure it reaches the desired height?
3	A wire is stretched from the top of a 5-meter tall pole to the ground, forming a right triangle. If the wire is 13 meters long, what is the horizontal distance from the base of the pole to the point where the wire touches the ground?

4	From home, Sam walked 1.8 km north before turning and walking 1.2 km west. How far is he directly from home?
5	A 5.8 m ladder reaches up a wall to a window 4.7 meters high. Calculate how far the bottom of the ladder is from the base of the wall.
6	The numbers 12, 35, and x form a Pythagorean triad. What is the value of x?
7	A ladder is placed against a wall such that the ladder makes a 45-degree angle with the ground. If the ladder is 12 meters long, how high up the wall does it reach?

8	A soccer field is a rectangle measuring 60 meters in length and 11 meters in width. What is the length of the longest straight-line path a player can run from one corner of the field to the opposite corner?
9	A triangle has sides measuring 12 cm, 16 cm, and 20 cm. Is this triangle a right triangle?
10	Sarah is swimming in a rectangular pool. The pool is 6.5 meters wide and 8.5 meters long. What is the shortest distance Sarah needs to swim from one corner of the pool to the opposite corner?

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Answer Key

Question 1: Answer the following.

1	In a right triangle, which side is the longest and opposite the right angle? A. Hypotenuse B. Adjacent side C. Opposite side D. Base Answer: A. Hypotenuse
2	What is the Pythagoras theorem used for? A. Calculating the area of a circle B. Finding the missing side in a right triangle C. Determining the volume of a rectangular prism D. Measuring the angles of a triangle Answer: B. Finding the missing side in a right triangle
3	What is the Pythagoras theorem equation? A. $a^2 = b^2 + c^2$ B. $a^2 = b^2 - c^2$ C. $a^2 + b^2 = c^2$ D. $a^2 - b^2 = c^2$ Answer: C. $a^2 + b^2 = c^2$
4	In a right triangle, if one of the shorter sides is 6 units long and the hypotenuse is 10 units long, what is the length of the other shorter side? A. 8 units B. 4 units C. 9 units D. 5 units Answer: A. 8 units

5	If the sides of a triangle have lengths 15 cm, 9 cm, and 12 cm, is the triangle a right triangle? A. Yes B. No Answer: A. Yes
6	If the lengths of the two shorter sides of a right triangle are 3 cm and 4 cm, what is the length of the hypotenuse? A. 7 cm B. 5 cm C. 12 cm D. 9 cm Answer: B. 5 cm
7	If one side of a right triangle is 5 cm and the other side is 12 cm, what is the length of the hypotenuse? A. 17 cm B. 13 cm C. 8 cm D. 15 cm Answer: B. 13 cm
8	Which of the following sets of numbers could represent the sides of a right triangle? A. 3, 4, 5 B. 2, 5, 9 C. 6, 8, 10 D. 7, 12, 15 Answer: A. 3, 4, 5
9	In a right triangle, if the lengths of the two shorter sides are 15 units and 8 units, what is the length of the hypotenuse?

	A. 13 units B. 20 units C. 17 units D. 25 units Answer: C. 17 units
10	If the hypotenuse of a right triangle is 40 cm and one of the shorter sides is 9 cm, what is the length of the other shorter side? A. 58 cm B. 56 cm C. 45cm D. 41cm Answer: D. 41cm

Question 2: Answer the following.

1	A right triangle has one side measuring 8 cm and another side measuring 15 cm. What is the length of the hypotenuse? Answer: The length of the hypotenuse is 17 cm.
2	John is building a ramp for his skateboard. The length of the ramp is 5 meters, and the height it needs to reach is 4 meters. How far away from the base of the wall should John place the ramp to ensure it reaches the desired height? Answer: John should place the ramp 3 meters away from the base of the wall.
3	A wire is stretched from the top of a 5-meter tall pole to the ground, forming a right triangle. If the wire is 13 meters long, what is the horizontal distance from the base of the pole to the point where the wire touches the ground? Answer: The horizontal distance is 12 meters.

4	From home, Sam walked 1.8 km north before turning and walking 1.2 km west. How far is he directly from home? Answer: He is 2.163 km (rounded to one decimal place) directly from home.
5	A 5.8 m ladder reaches up a wall to a window 4.7 meters high. Calculate how far the bottom of the ladder is from the base of the wall. Answer: The bottom of the ladder is 3.4 meters away from the base of the wall.
6	The numbers 12, 35, and x form a Pythagorean triad. What is the value of x? Answer: x = 37
7	A ladder is placed against a wall such that the ladder makes a 45-degree angle with the ground. If the ladder is 12 meters long, how high up the wall does it reach? Answer: The ladder reaches a height of 12 meters up the wall.
8	A soccer field is a rectangle measuring 60 meters in length and 11 meters in width. What is the length of the longest straight-line path a player can run from one corner of the field to the opposite corner? Answer: The player can run a distance of 61 meters.
9	A triangle has sides measuring 12 cm, 16 cm, and 20 cm. Is this triangle a right triangle? Answer: Yes, this triangle is a right triangle because it satisfies the Pythagorean theorem: $9^2 + 12^2 = 15^2$.
10	Sarah is swimming in a rectangular pool. The pool is 6.5 meters wide and 8.5 meters long. What is the shortest distance Sarah needs to swim from one corner of the pool to the opposite corner? Answer: Sarah needs to swim a distance of 10.7 meters.