ALBERT

Name _____ Date _____

Right Triangle Trigonometry Worksheet

Geometry · Common Core HSG-SRT.C.8

> Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

Practice

Builds the skill step by step.

1. A 20-foot ladder leans against a wall and makes a 70° angle with the ground. How high up the wall does it reach? Use sin 70° ≈ 0.9397. Round to the nearest tenth.

2. A ramp is 12 feet long and rises at a 10° angle. How high does it rise? Use sin 10° ≈ 0.1736. Round to the nearest tenth.

3. From 30 m away, the angle of elevation to the top of a tree is 40°. How tall is the tree? Use tan 40° ≈ 0.8391. Round to the nearest tenth.

4. A right triangle has legs 6 and 8. How long is the hypotenuse?

5. A right triangle has a hypotenuse of 10 and an acute angle of 35°. How long is the leg adjacent to the 35° angle? Use cos 35° ≈ 0.8192. Round to the nearest tenth.

6. What is an angle of elevation?

   A. the angle from the vertical down to the ground

   B. the angle from the horizontal up to the line of sight

   C. the angle between two buildings

   D. the angle at the top of a right triangle

7. A kite string 50 m long makes a 60° angle with the ground. How high is the kite? Use sin 60° ≈ 0.8660. Round to the nearest tenth.

8. The sun's angle of elevation is 45°. A building is 40 m tall. How long is its shadow?

9. A right triangle has legs 5 and 5. How long is the hypotenuse? Give the exact value.

10. A right triangle has a hypotenuse of 26 and a leg of 10. How long is the other leg?

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On Level

Grade-level practice.

1. A right triangle has a leg of 7 opposite angle A and a hypotenuse of 25, so sin A = 0.28. Use sin 16.26° ≈ 0.28. What is A to the nearest tenth of a degree?

2. A plane climbs along a straight path at 15° for 2,000 m. How much altitude does it gain? Use sin 15° ≈ 0.2588. Round to the nearest tenth.

3. From the top of a 50 m cliff, the angle of depression to a boat is 25°. How far is the boat from the base of the cliff? Use tan 25° ≈ 0.4663. Round to the nearest tenth.

4. A wheelchair ramp must rise 2 feet at an angle of 5°. How long must the ramp be? Use sin 5° ≈ 0.0872. Round to the nearest tenth.

5. An isosceles triangle has a base of 10 and base angles of 50°. What is its height? Use tan 50° ≈ 1.1918. Round to the nearest tenth.

6. A right triangle has a hypotenuse of 15 and an acute angle of 28°. How long is the leg opposite the 28° angle? Use sin 28° ≈ 0.4695. Round to the nearest tenth.

7. A 16-foot ladder touches a wall 15 feet up. How far is the base of the ladder from the wall? Round to the nearest tenth.

8. Why does the angle of depression from A down to B equal the angle of elevation from B up to A?

   A. They are vertical angles.

   B. They are always 45°.

   C. They are alternate interior angles formed by two horizontal (parallel) lines.

   D. They are complementary.

9. A 120-foot tower is seen from the ground at an angle of elevation of 32°. How far is the observer from the base? Use tan 32° ≈ 0.6249. Round to the nearest tenth.

10. A right triangle has legs 9 and 12. What is its perimeter?

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Challenge

Multi-step and word problems that stretch it.

1. Two observers stand in a line on the same side of a 100-foot tower. The angles of elevation to the top are 30° and 45°. How far apart are the observers? Use tan 30° ≈ 0.5774. Round to the nearest tenth.

2. Sam's eyes are 6 feet above the ground. He sees the top of a 30-foot flagpole at a 40° angle of elevation. How far is he from the pole? Use tan 40° ≈ 0.8391. Round to the nearest tenth.

3. In a right triangle, the leg adjacent to a 60° angle is 12. Use cos 60° = 0.5. How long is the hypotenuse?

4. An isosceles triangle has legs of 13 and a base of 10. What is its area?

5. A plane is 1.2 km higher than a point 5 km away horizontally. Use tan 13.5° ≈ 0.24. To the nearest tenth of a degree, what is the angle of elevation from the point to the plane?

6. A rectangle has a diagonal of 20 that makes a 30° angle with the longer side. What is the area? Use sin 30° = 0.5 and cos 30° ≈ 0.8660. Round to the nearest tenth.

7. A regular hexagon has sides of 8. What is the exact length of its apothem (the distance from the center to the middle of a side)?

8. A road has a 6% grade: it rises 6 m for every 100 m of horizontal distance. How much does it rise over 500 m of horizontal distance?

9. Safety rules say a ladder should make a 75° angle with the ground. A 24-foot ladder is set up this way. How far is its base from the wall? Use cos 75° ≈ 0.2588. Round to the nearest tenth.

10. From the top of an 80 m tower, the angles of depression to two cars in a straight line on the same side are 30° and 60°. How far apart are the cars? Use tan 30° ≈ 0.5774 and tan 60° ≈ 1.7321. Round to the nearest tenth.