

Directions: Calculate the value of each indicated variable. **Problems with a (d) will have a decimal answer.** Round all decimals to the **nearest tenth**. All other answers must be left in simplified radical form (also reduce all fractions). Remember there are five concepts to choose from for each problem:

- (1) Geometric Mean (2) Pythagorean Theorem (3) 45-45-90 (4) 30-60-90
 (5) Trigonometry (decimal answers)

1.

$x =$ _____
 $y =$ _____

2.

$x =$ _____
 $y =$ _____
 $z =$ _____

3.

$w =$ _____
 $x =$ _____
 $y =$ _____
 $z =$ _____

4.

$x =$ _____
 $y =$ _____
 $z =$ _____

5.

$x =$ _____

6.

$x =$ _____
 (d) $y =$ _____
 (d) $z =$ _____

7.

$x = \underline{\hspace{2cm}}$

$y = \underline{\hspace{2cm}}$

8.

$x = \underline{\hspace{2cm}}$

$y = \underline{\hspace{2cm}}$

$z = \underline{\hspace{2cm}}$

9.

Hint: You must find x before you can find y .

$x = \underline{\hspace{2cm}}$

(d) $y = \underline{\hspace{2cm}}$

10.

$x = \underline{\hspace{2cm}}$

(d) $y = \underline{\hspace{2cm}}$

Directions: Complete each word problem.

- 1.) The perimeter of a square is 20cm. Find the length of the diagonal.

- 2.) Find the geometric mean between 6 and 8.

- 3.) Can a triangle with side lengths 4, 4, and 7 be constructed?

- 4.) An isosceles triangle has side lengths 6cm, 6cm, and 10cm. Find the length of the altitude drawn to the 10cm side.

- 5.) An equilateral triangle has a perimeter of 45in. Find the length of the altitude.
- 6.) The diagonal of a square has a length of 8in. Find the perimeter of the square.
- 7.) Given a triangle with side lengths 4, 5, and 8, determine whether the triangle is acute, right, or obtuse.
- 8.) A rhombus has diagonals lengths 10m and 24m. Find the perimeter of the rhombus.
- 9.) Given a triangle with side lengths 8, 15, and 17, determine whether the triangle is acute, right or obtuse.
- 10.) 12 is the geometric mean between x and 16. Find x .
- 11.) Can a triangle with side lengths 4, 4, and 9 be constructed?
- 12.) Find the geometric mean between 7 and 8.

(d) 13.) A tree casts a shadow 81 feet long. The angle of elevation from the end of the shadow to the sun is 42° . What is the height of the tree?

(d) 14.) A 5.5 foot tall person standing 140 feet from the base of a building calculates the angle of elevation from his line of sight to the top of the building as 44° . What is the height of the building. (His line of sight is 5 feet off the ground.)

(d) 15.) You and a friend wave to each other from the top of two buildings. You are looking up at your friend at a 18° angle of elevation. You are standing on a 763 foot building. The height of the building that your friend is on is 795 feet. What is the approximate distance between the two buildings?

(d) 16.) You and your team are building a runway that will head toward an existing 500-foot tower. For safety reasons, the plane must be at least 200 feet above the tower when it flies over. If a jet takes off from the ground and ascends steadily at an angle of 31° , will it clear the tower that is 1000 feet from the point that the jet leaves the ground? If not, how far must the point of takeoff be from the tower?

(d) 17.) A kite is 38 feet above the ground. The child is holding the end of the kite string 4 feet above the ground. The kite string makes a rising angle (angle of elevation) of 42° from the point of reference. Assuming that the string is taut, how much string is out?