Math Worksheet for 8th Grade

Pythagorean theorem and distance between points

Name: Due Date: Teacher: Parent Sign:

Questions

1. In a right triangle, the legs measure 6 and 8. Find the hypotenuse.

2. A ladder reaches 15 ft up a wall when its base is 8 ft from the wall. How long is the ladder?

3. Find the length of the diagonal of a rectangle 9 cm by 12 cm.

4. A right triangle has hypotenuse 13 and one leg 5. Find the other leg.

5. A square has side length 10. What is the distance between opposite corners?

6. A TV screen is advertised as 55 inches measured diagonally. If its height is 27 in, find its width (to nearest tenth).

7. Find the distance between points (1, 2) and (7, 6).

8. Find the distance between points (-3, 4) and (3, -2).

9. Find the midpoint of the segment joining (2, -1) and (8, 5). (Short conceptual: use for checking distance problems.)

10. Two points are (4, 3) and (4, -5). What is the distance between them?

11. If a right triangle has legs a and b and hypotenuse c, show numerically for a=7, b=24 that $a^2 + b^2 = c^2$. (Compute c.)

12. A point is 13 units from the origin and has x-coordinate 5. Find its y-coordinate(s).

13. A square of side (a+b) is formed by arranging four congruent right triangles (legs a, b) in the corners leaving a central tilted square. Write an equation for the area of the large square using $(a + b)^2$ and the areas of the 4 triangles plus the central square (this is Bhaskara's proof starting equation).

14. Using the equation from Q13, show algebraically that $c^2 = a^2 + b^2$ (explain the step).

15. In words, describe the main idea behind Bhaskara's proof of the Pythagorean theorem.

16. A right triangle has legs 3 and 4. Use Bhaskara's arrangement idea to compute the hypotenuse.

17. Explain (in one or two sentences) the main idea of the proof of the Pythagorean theorem that uses similarity (the altitude to the hypotenuse).

18. In a right triangle with hypotenuse c and altitude to the hypotenuse of length h, the altitude divides the hypotenuse into segments of lengths d and e (so d+e = c). If one leg has length a, write the similarity proportion that gives $a^2 = c * d$ (or explain why $a^2 = c \cdot d$).

19. In the similarity-based proof, if a=8, c=17, find d (the projection of a on c) using $a^2 = c \cdot d$.

20. Give a short, clear statement of Garfield's approach to a proof of the Pythagorean theorem (one or two sentences).

21. A trapezoid is made from three congruent right triangles (arranged as in Garfield's proof). Describe why computing the trapezoid's area two different ways leads to $a^2 + b^2 = c^2$ (short explanation).