

Reducing Radicals/Pythagorean Theorem Homework

Name Key Class _____ Date _____

Simplify each expression into **simplest radical form**. Show work.

1. $\sqrt{125} = \sqrt{5 \cdot 25}$

$5\sqrt{5}$

2. $\sqrt{512} = \sqrt{256 \cdot 2}$

$16\sqrt{2}$

3. $\sqrt{216} = \sqrt{36 \cdot 6}$

$6\sqrt{6}$

4. $\sqrt{75} = \sqrt{3 \cdot 25}$

$5\sqrt{3}$

5. $\sqrt{64}$

8

6. $\sqrt{96} = \sqrt{16 \cdot 6}$

$4\sqrt{6}$

7. $\sqrt{72} = \sqrt{36 \cdot 2}$

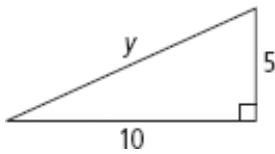
$6\sqrt{2}$

8. $\sqrt{150} = \sqrt{25 \cdot 6}$

$5\sqrt{6}$

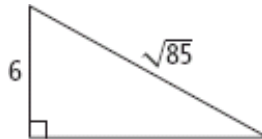
Algebra Find the value of y . Express in **simplest radical form**. Show work.

9.



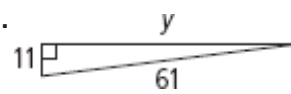
$$\begin{aligned} a^2 + b^2 &= c^2 \\ 10^2 + 5^2 &= y^2 \\ 100 + 25 &= y^2 \\ 125 &= y^2 \\ 5\sqrt{5} &= y \end{aligned}$$

10.



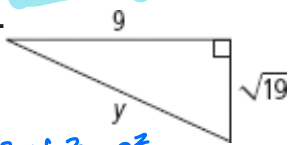
$$\begin{aligned} a^2 + b^2 &= c^2 \\ 6^2 + y^2 &= (\sqrt{85})^2 \\ 36 + y^2 &= 85 \\ -36 & \quad -36 \\ y^2 &= 49 \\ y &= 7 \end{aligned}$$

11.



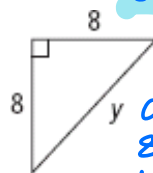
$$\begin{aligned} a^2 + b^2 &= c^2 \\ 11^2 + y^2 &= 61^2 \\ 121 + y^2 &= 3721 \\ -121 & \quad -121 \\ \hline y^2 &= 3600 \\ y &= 60 \end{aligned}$$

12.



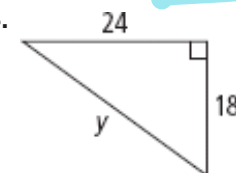
$$\begin{aligned} a^2 + b^2 &= c^2 \\ (\sqrt{19})^2 + 9^2 &= y^2 \\ 19 + 81 &= y^2 \\ 100 &= y^2 \\ 10 &= y \end{aligned}$$

13.



$$\begin{aligned} a^2 + b^2 &= c^2 \\ 8^2 + 8^2 &= y^2 \\ 64 + 64 &= y^2 \\ 128 &= y^2 \\ 8\sqrt{2} &= y \end{aligned}$$

14.



$$\begin{aligned} a^2 + b^2 &= c^2 \\ 18^2 + 24^2 &= y^2 \\ 324 + 576 &= y^2 \\ 900 &= y^2 \\ 30 &= y \end{aligned}$$

The lengths of the sides of a triangle are given. Classify each triangle as *acute*, *right*, or *obtuse*. Show work.

15. 3, 8, 10

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 3^2 + 8^2 &= 10^2 \\ 9 + 64 &= 100 \\ 73 &\neq 100 \end{aligned}$$

OBTUSE

16. 4, 5, 7

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 4^2 + 5^2 &= 7^2 \\ 16 + 25 &= 49 \\ 41 &\neq 49 \end{aligned}$$

OBTUSE

17. 12, 15, 19

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 12^2 + 15^2 &= 19^2 \\ 144 + 225 &= 361 \\ 369 &\neq 361 \end{aligned}$$

ACUTE

18. 10, 24, 26

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 10^2 + 24^2 &= 26^2 \\ 100 + 576 &= 676 \\ 676 &= 676 \end{aligned}$$

RIGHT

19. 20, 21, 28

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 20^2 + 21^2 &= 28^2 \\ 400 + 441 &= 784 \\ 841 &\neq 784 \end{aligned}$$

ACUTE

20. 20, 48, 52

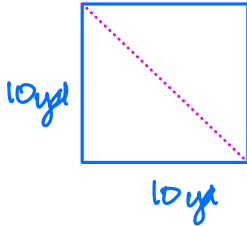
$$\begin{aligned} a^2 + b^2 &= c^2 \\ 20^2 + 48^2 &= 52^2 \\ 400 + 2304 &= 2704 \\ 2704 &= 2704 \end{aligned}$$

RIGHT

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21. A square has side length 10 yd. What is the length of a diagonal of the square?

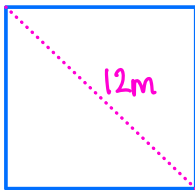
Express in simplest radical form. Show work.



$$\begin{aligned} a^2 + b^2 &= c^2 \\ 10^2 + 10^2 &= c^2 \\ 100 + 100 &= c^2 \\ 200 &= c^2 \\ \sqrt{200} &= c \\ 10\sqrt{2} &= c \end{aligned}$$

The diagonal is $10\sqrt{2}$ yards long.

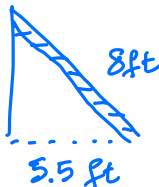
22. A square has diagonal length 12 m. What is the side length of the square? **Express in simplest radical form. Show work.**



$$\begin{aligned} a^2 + b^2 &= c^2 \\ \text{since this is a square, } a &= b \\ a^2 + a^2 &= 12^2 \\ \frac{2a^2}{2} &= \frac{144}{2} \\ a^2 &= 72 \\ a &= 6\sqrt{2} \end{aligned}$$

Each side is $6\sqrt{2}$ meters.

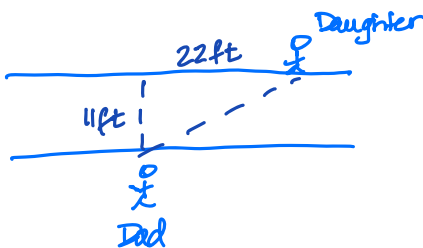
23. A repairman leans the top of an 8-ft ladder against the top of a stone wall. The base of the ladder is 5.5 ft from the wall. About how tall is the wall? **Round to the nearest tenth of a foot. Show work.**



$$\begin{aligned} a^2 + b^2 &= c^2 \\ 5.5^2 + b^2 &= 8^2 \\ 30.25 + b^2 &= 64 \\ \underline{-30.25} \quad \underline{-30.25} & \\ b^2 &= 33.75 \\ b &= \sqrt{33.75} \\ b &= 5.8 \end{aligned}$$

The wall is 5.8 feet high.

24. A river runs straight through the center of a park. A man stands on one bank of the river, and his daughter stands across the river and 22 ft upstream. The man's son swims from the man to his daughter. If the river is 11 ft wide, how far does the son swim? **Round to the nearest foot. Show work.**



$$\begin{aligned} a^2 + b^2 &= c^2 \\ 11^2 + 22^2 &= c^2 \\ 121 + 484 &= c^2 \\ \sqrt{605} &= \sqrt{c^2} \\ 24.6 &= c \end{aligned}$$

The son swims 25 feet.