Name:_____ 8.1 Radicals & Pythagorean & Converse Date:_____ Period:____

Key

1-10 Simply the expressions by leaving your answer in reduced radical form.

1. $\sqrt{24}$
$\sqrt{4\cdot6}$
$2\sqrt{6}$

2. $-\sqrt{72}$
$-(\sqrt{36\cdot2})$
$-6\sqrt{2}$

3. $\sqrt{6}\cdot\sqrt{8}$
$\sqrt{48}$
$\sqrt{16\cdot3}$
$4\sqrt{3}$

4. $-4\sqrt{8}+2\sqrt{8}$
$-2\sqrt{8}$
$-2(2\sqrt{2})$
$-4\sqrt{2}$

5. $2\sqrt{12}$
$2\sqrt{4\cdot3}$
$2\cdot2\sqrt{3}$
$4\sqrt{3}$

6. $\frac{3}{\sqrt{6}}$
$\frac{3\sqrt{6}}{6}$
$\frac{\sqrt{6}}{2}$

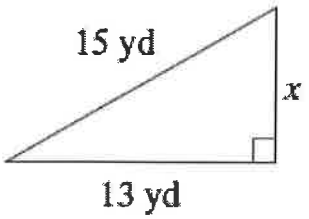
7. $\frac{8}{\sqrt{12}}$
$\frac{8\sqrt{12}}{12}$ $\frac{4\sqrt{3}}{3}$
$\frac{2}{3}(\sqrt{4\cdot3})$
$\frac{2\cdot2\sqrt{3}}{3}$

8. $\frac{\sqrt{4}}{4\sqrt{5}}\frac{\sqrt{5}}{\sqrt{5}}=\frac{\sqrt{20}}{20}=\frac{\sqrt{4}\sqrt{5}}{20}$
$\frac{2\sqrt{5}}{20}=\frac{\sqrt{5}}{10}$

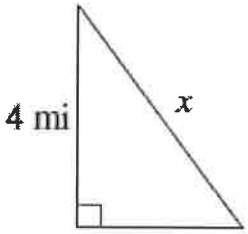
9. $\sqrt{4}-\sqrt{16}+\sqrt{2}-6\sqrt{2}$
$2-4+-5\sqrt{2}$
$-2-5\sqrt{2}$

10. $5\sqrt{7}+\sqrt{3}-8\sqrt{7}$
$-3\sqrt{7}+\sqrt{3}$

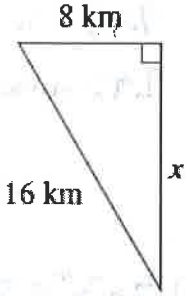
11. Find the missing side of each triangle. Leave your answer in reduced radical form.



$15^2=13^2+x^2$
$\sqrt{15^2-13^2}=x$
$\sqrt{56}=x$
$\sqrt{4\cdot14}=x$
$2\sqrt{14}=x$

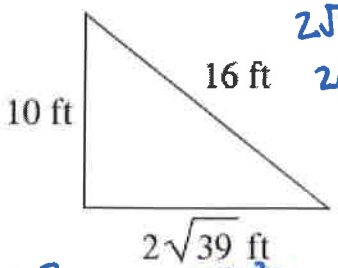


$4^2+3^2=x^2$
$\sqrt{25}=x$
$5=x$



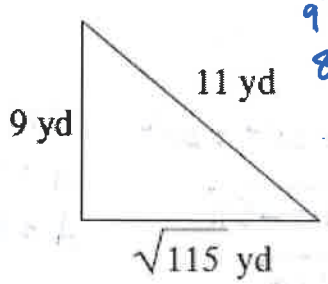
$16^2=8^2+x^2$
$\sqrt{16^2-8^2}=x$
$\sqrt{192}$
$\sqrt{64\cdot3}=x=8\sqrt{3}$

12. State if each triangle is a right triangle. Then find the perimeter of the triangle in reduced radical form.



$2\sqrt{39}+10+16$
$26+2\sqrt{39}$

$16^2=10^2+(2\sqrt{39})^2$
$256=100+4\cdot39=256$ ✓ yes



$9^2+\sqrt{115}^2=11^2$
$81+115\neq121$ no
$9+11+\sqrt{115}$
$20+\sqrt{115}$

13. State if the three side lengths form a right triangle.

6, $2\sqrt{22}$, 17

$6^2+(2\sqrt{22})^2=17^2$

$36+4(22)=289$

$124 \neq 289$

NO

4.8, 28.6, 29

$4.8^2+28.6^2=29^2$

$23.04+817.96=841$

$841=841$

yes

Questions 14-17 round your answers to the nearest hundreth if necessary.

14. Tina built a triangular sign with side lengths of 73 inches, 55 inches, and 4 feet. Is the sign a right triangle? Why or why not?

$73^2=55^2+48^2$

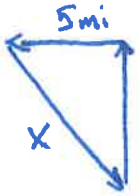
$5329=3025+2304$

$5329=5329$

yes because the Pythagorean Theorem holds true for the 3 sides

$(6.08\overline{3})^2=(4.58\overline{3})^2+4^2 \approx 37.01$

15. Two joggers run 8 miles north and then 5 miles west. What is the shortest distance they must travel to return to their starting point?



$5^2+8^2=x^2$

$\sqrt{89}=x$

$9.43=x$

9.43 miles

16. Oscar's dog house is shaped like a tent. The slanted sides are both 5 feet long and the bottom of the house is 6 feet across. What is the height of his dog house, in feet, at its tallest point?

$h^2+3^2=5^2$

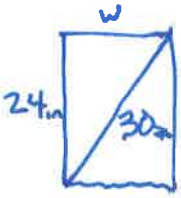
$h^2=25-9$

$h=\sqrt{16}$

$h=4ft.$

The tallest point is 4 feet.

17. A suitcase measures 24 inches long and the diagonal is 30 inches long. How much material is needed to cover one side of the suitcase?



$24^2+w^2=30^2$

$w=\sqrt{900-576}$

$w=\sqrt{324}$

$w=18$ in

$A=lw$

$A=24 \cdot 18$

$A=432 in^2$

$432 in^2$ of materials is needed to cover one side