Geometry
Radicals, Pyth. Thm., & Special Right Triangles Quiz Review

Name: Key
Date: _____

PART I: Radicals

1. $\sqrt{63} =$

$\sqrt{9}\sqrt{7}$

$\boxed{3\sqrt{7}}$

2. $-2\sqrt{54} =$

$-2\sqrt{9}\sqrt{6}$

$-2 \cdot 3\sqrt{6}$

$\boxed{-6\sqrt{6}}$

3. $-6\sqrt{121} =$

$-6 \cdot 11$

$\boxed{-66}$

4. $5\sqrt{220} =$

$5\sqrt{4}\sqrt{55}$

$5 \cdot 2\sqrt{55}$

$\boxed{10\sqrt{55}}$

5. $\sqrt{72x^6y^9z} =$

$\sqrt{36}\sqrt{2}$

$\boxed{6x^3y^4\sqrt{2yz}}$

6. $4\sqrt{180x^9} =$

$\sqrt{36}\sqrt{5}$

$4 \cdot 6\sqrt{5x^9}$

$\boxed{24x^4\sqrt{5x}}$

7. $-3\sqrt{28x^5y^3} =$

$\sqrt{4}\sqrt{7}$

$-3 \cdot 2x^4y\sqrt{7xy}$

$\boxed{-6x^4y\sqrt{7xy}}$

8. $-3\sqrt{44x^2y^{11}z} =$

$\sqrt{4}\sqrt{11}$

$-3 \cdot 2xy^5\sqrt{11yz}$

$\boxed{-6xy^5\sqrt{11yz}}$

9. $\sqrt{3} \cdot \sqrt{7} =$

$\boxed{\sqrt{21}}$

10. $2\sqrt{6} \cdot \sqrt{6} =$

$2 \cdot 6$

$\boxed{12}$

11. $4\sqrt{2} \cdot 6\sqrt{11} =$

$\boxed{24\sqrt{22}}$

12. $5\sqrt{12} \cdot \sqrt{8} =$

$5\sqrt{96}$

$5\sqrt{16}\sqrt{6}$

$5 \cdot 4\sqrt{6}$

$\boxed{20\sqrt{6}}$

13. $\sqrt{2a^2} \cdot \sqrt{30a^5} =$

$\sqrt{60a^7}$

$\sqrt{4}\sqrt{15}$

$\boxed{2a^3\sqrt{15a}}$

14. $5\sqrt{11xy^3} \cdot 2\sqrt{5x^2y} =$

$10\sqrt{55x^3y^4}$

$\boxed{10xy^2\sqrt{55x}}$

15. $-2\sqrt{2}\left(3+\sqrt{2}\right) =$

$-6\sqrt{2} - 2\sqrt{4}$

$-6\sqrt{2} - 2(2)$

$\boxed{-6\sqrt{2} - 4}$

16. $\sqrt{15}\left(5\sqrt{10}+\sqrt{6}\right) =$

$5\sqrt{150} + \sqrt{90}$

$5\sqrt{25}\sqrt{6} + \sqrt{9}\sqrt{10}$

$5 \cdot 5\sqrt{6} + 3\sqrt{10}$

$\boxed{25\sqrt{6} + 3\sqrt{10}}$

17. $\sqrt{\frac{180}{5}} = \sqrt{36} = \boxed{6}$

18. $\frac{8\sqrt{11}}{2\sqrt{16}\sqrt{2}} = \frac{\sqrt{11}}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$= \frac{\sqrt{22}}{2 \cdot 2} = \boxed{\frac{\sqrt{22}}{4}}$

19. $\sqrt{\frac{30}{90}} = \sqrt{\frac{3}{9}} = \boxed{\frac{\sqrt{3}}{3}}$

20. $\frac{-4\sqrt{5}}{7\sqrt{12}} = \frac{-4\sqrt{5}}{14\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} =$

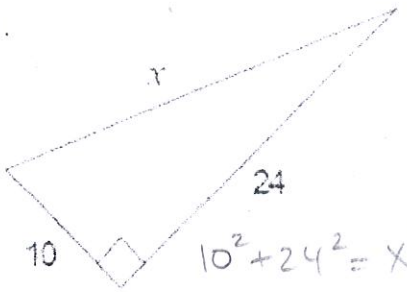
$= \frac{-4\sqrt{15}}{14 \cdot 3}$

$= \frac{-4\sqrt{15}}{42} = \boxed{\frac{-2\sqrt{15}}{21}}$

Simplify
$7\sqrt{12}$
$7\sqrt{4} \cdot \sqrt{3}$
$7 \cdot 2\sqrt{3}$
$14\sqrt{3}$

PART II: Pythagorean Theorem $a^2+b^2=c^2$ Simplify!

1.



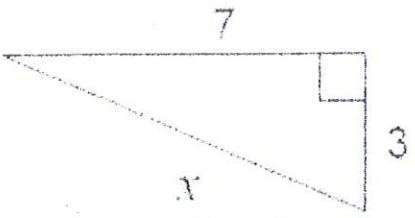
$10^2+24^2=x^2$

$100+576=x^2$

$676=x^2$

$x=24$

2.



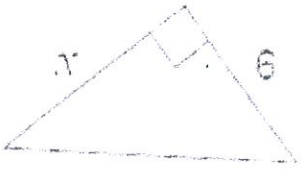
$3^2+7^2=x^2$

$9+21=x^2$

$30=x^2$

$x=\sqrt{30}$

3.



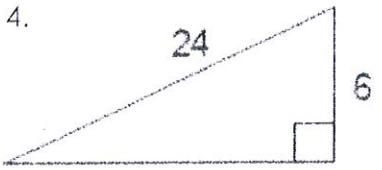
$6^2+x^2=10^2$

$36+x^2=100$

$x^2=64$

$x=8$

4.



$6^2+x^2=24^2$

$36+x^2=576$

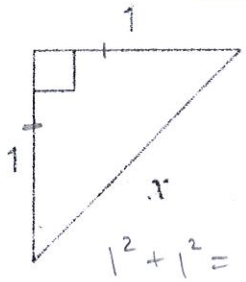
$x^2=540$

$x=\sqrt{540}$

$x=\sqrt{36}\sqrt{15}$

$x=6\sqrt{15}$

5.

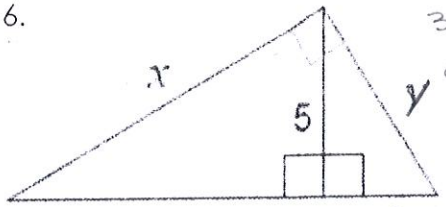


$1^2+1^2=x^2$

$2=x^2$

$x=\sqrt{2}$

6.



$3^2+5^2=y^2$

$9+25=y^2$

$34=y^2$

$y=\sqrt{34}$

$5^2+9^2=x^2$

$25+81=x^2$

$106=x^2$

$x=\sqrt{106}$

For the following applications, make sure you draw a picture, show your work, and answer the question.

7. Two sides of a right triangle are 4 and 12 in.

a. Find the missing side if these are the lengths of the legs.

$4^2+12^2=x^2$

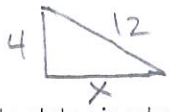
$16+144=x^2$

$160=x^2$

$x=\sqrt{16}\sqrt{10}$

$x=4\sqrt{10}$

b. Find the missing side if these are the lengths of a leg and hypotenuse.



$4^2+b^2=12^2$

$16+b^2=144$

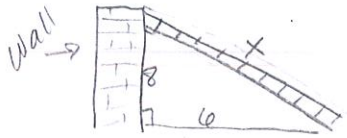
$b^2=128$

$b=\sqrt{128}$

$b=\sqrt{64}\sqrt{2}$

$b=8\sqrt{2}$

8. The foot of a ladder is placed 6 feet from a wall. If the top of the ladder rests 8 feet up on the wall, how long is the ladder?



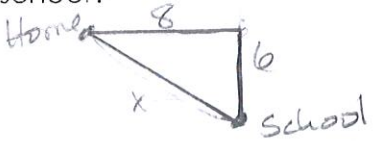
$8^2+6^2=x^2$

$64+36=x^2$

$100=x^2$

$x=10$

9. John leaves school to go home. He walks 6 blocks North and then 8 blocks west. How far is John from the school?



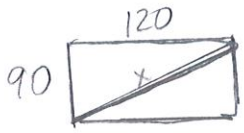
$8^2+6^2=x^2$

$64+36=x^2$

$100=x^2$

10 blocks

10. A soccer field is a rectangle 90 meters wide and 120 meters long. The coach asks players to run from one corner to the corner diagonally across. What is this distance?



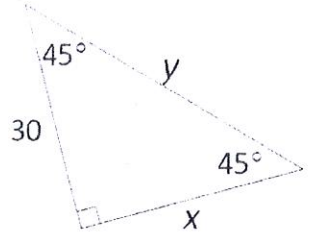
$90^2+120^2=x^2$

$8100+14400=x^2$

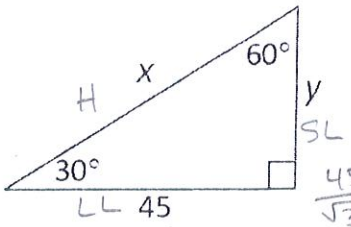
$22{,}500=x^2$

$x=150$

PART III: Find the value of each variable in radical form.

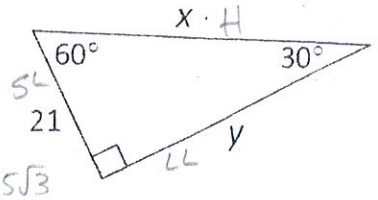
1. 

x = 30 y = $30\sqrt{2}$

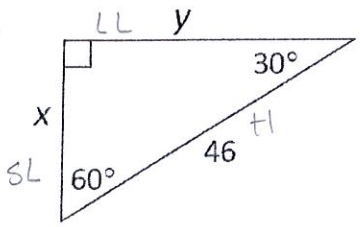
2. 

$\frac{45}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{45\sqrt{3}}{3}$

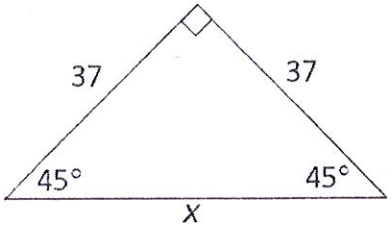
x = $30\sqrt{3}$ y = $15\sqrt{3}$

3. 

x = 42 y = $21\sqrt{3}$

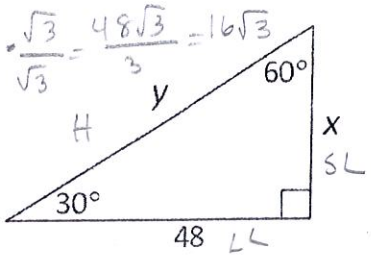
4. 

x = 23 y = $23\sqrt{3}$

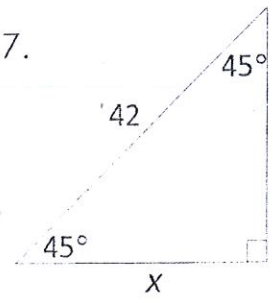
5. 

x = $37\sqrt{2}$

6. $\frac{48}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{48\sqrt{3}}{3} = 16\sqrt{3}$

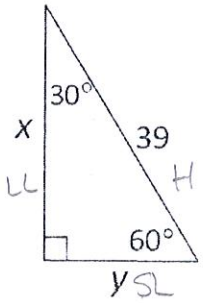


x = $16\sqrt{3}$ y = $32\sqrt{3}$

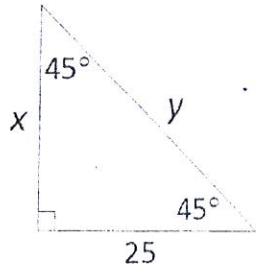
7. 

$\frac{42}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{42\sqrt{2}}{2}$

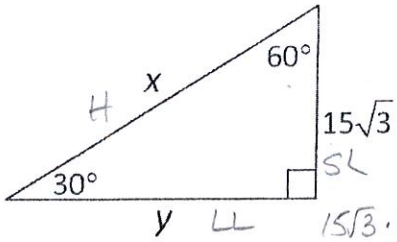
x = $21\sqrt{2}$ y = $21\sqrt{2}$

8. 

x = $\frac{39\sqrt{3}}{2}$ y = $\frac{39}{2}$

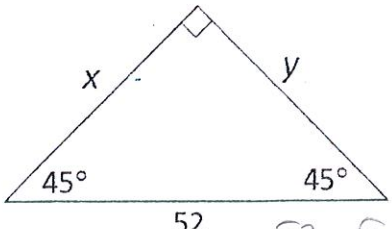
9. 

x = 25 y = $25\sqrt{2}$

10. 

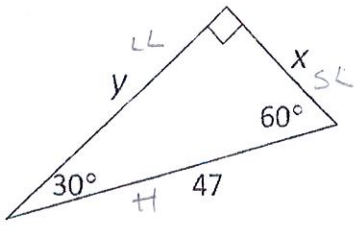
$15\sqrt{3} \cdot \sqrt{3}$
$15 \cdot 3$

x = $30\sqrt{3}$ y = 45

11. 

$\frac{52}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{52\sqrt{2}}{2}$

x = $26\sqrt{2}$ y = $26\sqrt{2}$

12. 

x = $\frac{47}{2}$ y = $\frac{47\sqrt{3}}{2}$