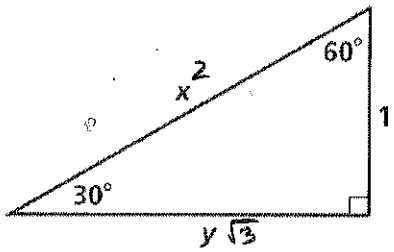
Geometry
Test Review - Special Right Triangles

Name: Key
Date: _____

I. Special Right Triangles

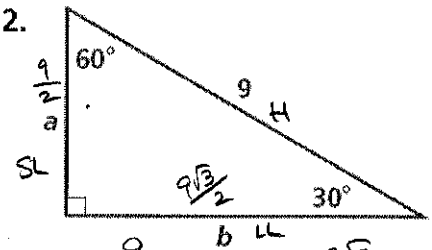
Find the value of each variable. Leave your answers in simplest radical form.

1.



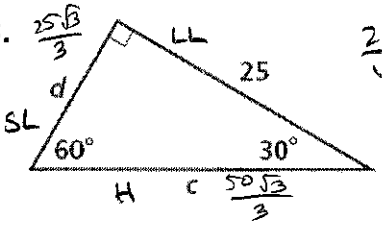
$x =$ 2 $y =$ $\sqrt{3}$

2.



$a =$ $\frac{9}{2}$ $b =$ $\frac{9\sqrt{3}}{2}$

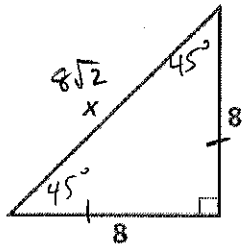
3.



$\frac{25}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{25\sqrt{3}}{3}$

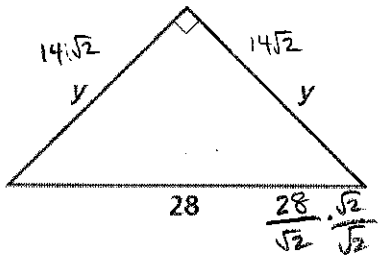
$c =$ $\frac{50\sqrt{3}}{3}$ $d =$ $\frac{25\sqrt{3}}{3}$

4.



$x =$ $8\sqrt{2}$

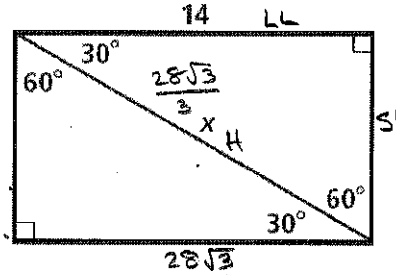
5.



$\frac{28}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{28\sqrt{2}}{2}$

$y =$ $14\sqrt{2}$

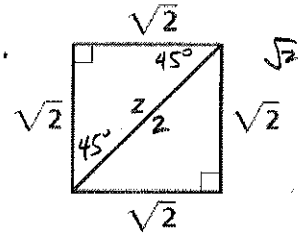
6.



$\frac{14}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{14\sqrt{3}}{3}$

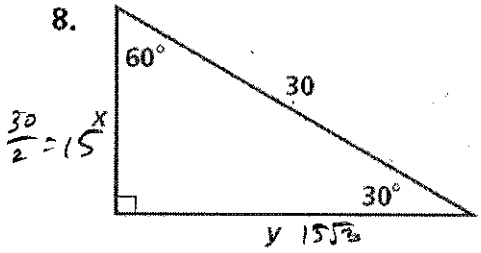
$x =$ $\frac{28\sqrt{3}}{3}$

7.



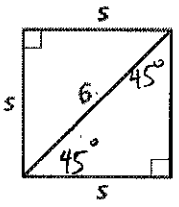
$z =$ 2

8.



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

9.

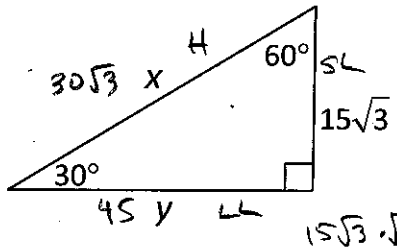


$\frac{6}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{6\sqrt{2}}{2} = 3\sqrt{2}$

$s =$ $3\sqrt{2}$

x = _____ y = _____ x = _____ x = _____ y = _____

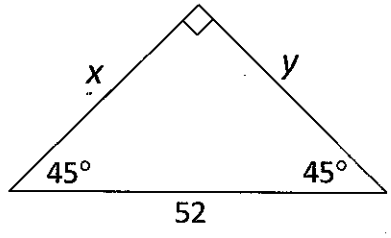
10.



$15\sqrt{3} \cdot \sqrt{3} = 15 \cdot 3 = 45$

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

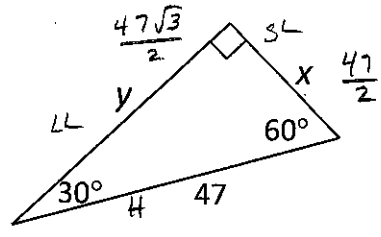
11.



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

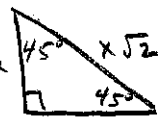
$\frac{52}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{52\sqrt{2}}{2} = 26\sqrt{2}$

12.



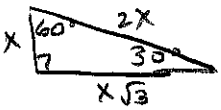
$x =$ $\frac{47}{2}$ $y =$ $\frac{47\sqrt{3}}{2}$

sing the ratio for a 45-45-90 triangle, fill in the table.



LEG x	LEG x	HYPOTENUSE $x\sqrt{2}$
10	10	$10\sqrt{2}$
$\frac{4\sqrt{3}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{4\sqrt{6}}{2} = 2\sqrt{6}$	$2\sqrt{6}$	$4\sqrt{3}$
$\frac{\sqrt{15}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{30}}{2}$	$\frac{\sqrt{30}}{2}$	$\sqrt{15}$
$\sqrt{3}$	$\sqrt{3}$	$\sqrt{3} \cdot \sqrt{2}$ $\sqrt{6}$
$\frac{6}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{6\sqrt{2}}{2} = 3\sqrt{2}$	$3\sqrt{2}$	6

14. Using the ratio for a 30-60-90 triangle, fill in the table.

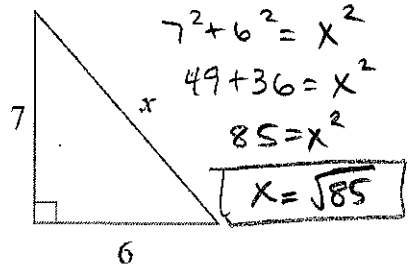


SHORT LEG x	LONG LEG $x\sqrt{3}$	HYPOTENUSE $2x$
31	$31\sqrt{3}$	62
$\frac{6\sqrt{5}}{2} = 3\sqrt{5}$	$3\sqrt{5} \cdot \sqrt{3} = 3\sqrt{15}$	$6\sqrt{5}$
$\sqrt{6}$	$\sqrt{6} \cdot \sqrt{3} = \sqrt{18} = \sqrt{9} \cdot \sqrt{2}$ $3\sqrt{2}$	$2\sqrt{6}$
$\frac{16}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{16\sqrt{3}}{3}$	16	$\frac{16\sqrt{3}}{3} \cdot 2 = \frac{32\sqrt{3}}{3}$
$\frac{10\sqrt{12}}{\sqrt{3}} = 10\sqrt{4} = 10 \cdot 2 = 20$	$10\sqrt{12}$	40

II. Pythagorean Theorem

Put your answers in simplest radical form!

1.



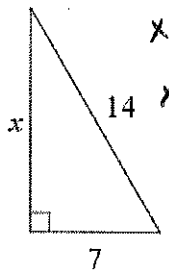
$7^2 + 6^2 = x^2$

$49 + 36 = x^2$

$85 = x^2$

$x = \sqrt{85}$

2.



$x^2 + 7^2 = 14^2$

$x^2 + 49 = 196$

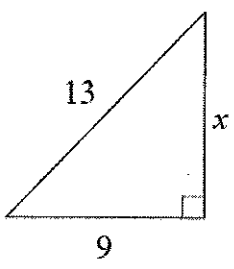
$x^2 = 147$

$x = \sqrt{147}$

$x = \sqrt{49}\sqrt{3}$

$x = 7\sqrt{3}$

3.



$9^2 + x^2 = 13^2$

$81 + x^2 = 169$

$x^2 = 88$

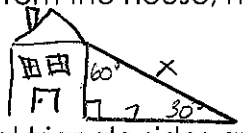
$x = \sqrt{88}$

$x = \sqrt{4}\sqrt{22}$

$x = 2\sqrt{22}$

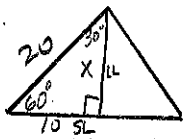
ythagorean Theorem and Special Right Triangle Word Problems

A ladder is leaning against the side of a house at a 60 degree angle. If the base of the ladder is meters away from the house, how tall is the ladder?



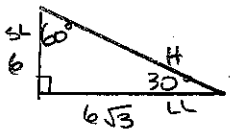
$\frac{7}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{7\sqrt{3}}{3}$ $\frac{7\sqrt{3}}{3} \cdot 2 = \boxed{\frac{14\sqrt{3}}{3}}$

2. An equilateral triangle sides are 20 inches and angles are 60 degrees. What is the length of the altitude?



$\boxed{10\sqrt{3} \text{ inches}}$

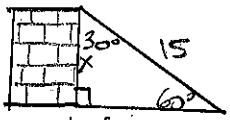
3. In a 30-60-90 triangle, the longest leg is $6\sqrt{3}$, what is the length of the shortest leg and the hypotenuse?



Short Leg: $\frac{6\sqrt{3}}{\sqrt{3}} = 6$

Hypotenuse: $6(2) = 12$

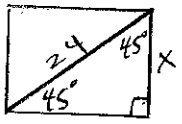
4. A 15 feet ladder is placed against a wall. What is the distance from the ground straight up to the top of the ladder if it creates a 30 degree angle at the top of the ladder?



Distance from base of ladder to wall: $\frac{15}{2}$ ft.

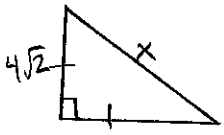
Distance from ground to top of ladder: $\frac{15\sqrt{3}}{2}$ ft.

5. The diagonal of a square is 24 inches long. What is the length of the sides of the square?



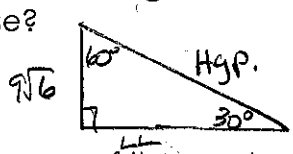
$\frac{24}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{24\sqrt{2}}{2} = \boxed{12\sqrt{2} \text{ inches}}$

6. An isosceles right triangle has a leg of $4\sqrt{2}$ *cm*. What is the length of the hypotenuse?



$4\sqrt{2} \cdot \sqrt{2} = 4\sqrt{4} = 4 \cdot 2 = \boxed{8 \text{ cm}}$

7. In a 30-60-90 triangle, the shortest leg is $9\sqrt{6}$, what is the length of the longest leg and the hypotenuse?



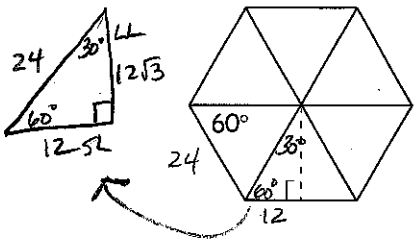
Long Leg $= 9\sqrt{6}\sqrt{3} = 9\sqrt{18} = 9\sqrt{9}\sqrt{2} = 9 \cdot 3\sqrt{2} = \boxed{27\sqrt{2}}$

Hypotenuse $= 9\sqrt{6}(2) = \boxed{18\sqrt{6}}$

8. Find the area of the regular hexagon that has a side length of 24. (Area of triangle = ½bh)

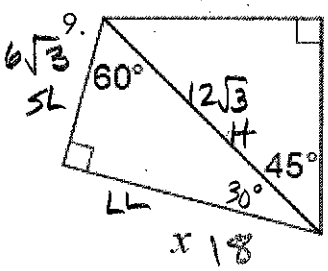
Area of $1\Delta = \frac{1}{2}bh = \frac{1}{2}(24)(12\sqrt{3}) = 144\sqrt{3}$

Area of hexagon $= 144\sqrt{3}(6) = \boxed{864\sqrt{3}}$



Solve for x.

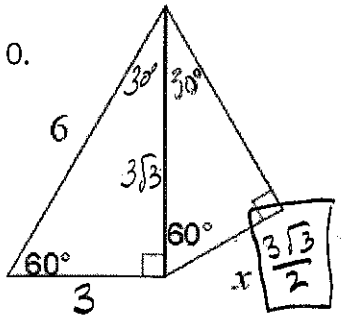
9.



$6\sqrt{6} = 6\sqrt{6} \cdot \sqrt{2} = 6\sqrt{12} = 6\sqrt{4}\sqrt{3} = 6 \cdot 2\sqrt{3} = 12\sqrt{3}$

$6\sqrt{3} \cdot \sqrt{3} = 6 \cdot 3 = \boxed{18}$

10.



adical Operations

1. $\sqrt{27} = \sqrt{9}\sqrt{3}$

$3\sqrt{3}$

2. $\sqrt{75} = \sqrt{25}\sqrt{3}$

$5\sqrt{3}$

3. $-2\sqrt{72} =$

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

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

$-12\sqrt{2}$

4. $5\sqrt{144} =$

$5 \cdot 12$

60

5. $\sqrt{25n^4} = 5n^2$

6. $\sqrt{72xy^3} =$

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

$6y\sqrt{2x}y$

7. $\sqrt{192a^{12}b^5} =$

$14a^6b^2\sqrt{b}$

8. $\sqrt{m^{15}n^4p^{23}} =$

$m^7n^2p^{11}\sqrt{mp}$

9. $\sqrt{3} \cdot \sqrt{5} = \sqrt{15}$

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

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

$24\sqrt{22}$

12. $2\sqrt{12} \cdot \sqrt{6} =$

$2\sqrt{72}$

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

$2 \cdot 6\sqrt{2}$

$12\sqrt{2}$

13. $\sqrt{4a^8} \bullet \sqrt{5a^3} =$

$\sqrt{20a^{11}}$

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

$2a^5\sqrt{5a}$

14. $2\sqrt{14} \bullet \sqrt{7} =$

$2\sqrt{98}$

$2\sqrt{49}\sqrt{2}$

$2 \cdot 7\sqrt{2}$

$14\sqrt{2}$

15. $5\sqrt{11xy^3} \bullet 2\sqrt{3x^2y^7} =$

$10\sqrt{33x^3y^{10}}$

$10xy^5\sqrt{33x}$

16. $-2\sqrt{12} \bullet 5\sqrt{60} =$

$-10\sqrt{720}$

$-10\sqrt{144} \cdot \sqrt{5}$

$-10 \cdot 12\sqrt{5}$

$-120\sqrt{5}$

17. $\sqrt{\frac{72}{8}} = \sqrt{9} = 3$

18. $\sqrt{\frac{60}{5}} = \sqrt{12}$

$\sqrt{4}\sqrt{3}$

$2\sqrt{3}$

19. $\frac{8\sqrt{5}}{8\sqrt{2}} = \frac{3\sqrt{5}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$\frac{3\sqrt{10}}{2}$

20. $\frac{8}{\sqrt{27}} = \frac{8}{\sqrt{9}\sqrt{3}}$

$\frac{8}{3\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{8\sqrt{3}}{3 \cdot 3}$

$\frac{8\sqrt{3}}{9}$

21. $\frac{2\sqrt{2}}{3\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$\frac{2\sqrt{6}}{3 \cdot 3} = \frac{2\sqrt{6}}{9}$

22. $\frac{\sqrt{81}}{\sqrt{324}} = \frac{\sqrt{1}}{\sqrt{4}} = \frac{1}{2}$

23. $\sqrt{\frac{204}{459}} = \frac{\sqrt{4}}{\sqrt{9}} = \frac{2}{3}$

24. $\frac{2\sqrt{20}}{7\sqrt{45}} = \frac{2\sqrt{4}}{7\sqrt{9}}$

$= \frac{2 \cdot 2}{7 \cdot 3} = \frac{4}{21}$