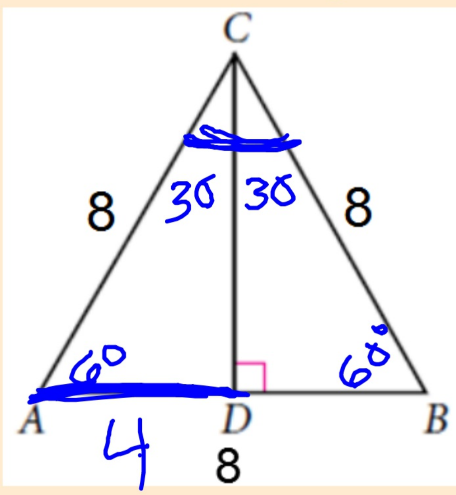
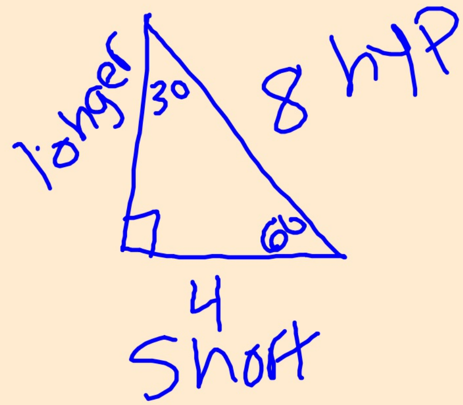
Welcome Back MYP Math 9!

	Assignment Effort Grade (Circle One)	Comments (What was interesting or challenging?)
Monday Date: 12/18 Topic: 45-45-90 Triangle Review	0 1 2	
Tuesday Date: ______ Topic: ____________	0 1 2	
Wednesday Date: ______ Topic: ____________	0 1 2	
Thursday Date: ______ Topic: ____________	0 1 2	
Friday Date: ______ Topic: ____________	0 1 2	

Warm-up: *ΔABC* is equilateral.
Find the length of AD.

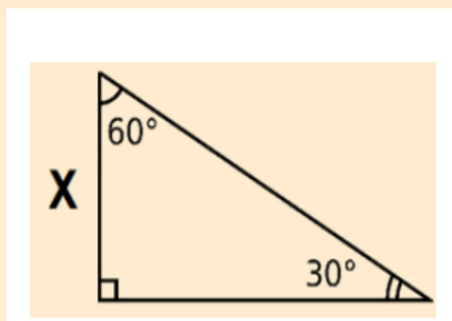


$$\frac{180}{3} = 60°$$



Class Plan:

1. Warm-up
2. Special Right Triangles 30 - 60 - 90.
3. Examples
4. Practice

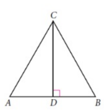


Investigation: Special Right Triangles

1. Relationship between hyptenuse & short leg

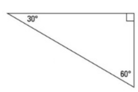
Right Triangle: (30° - 60° - 90°)

(Part 1): ΔABC is equilateral.



How are AC and AD related? (*Consider the warm-up*)

(Part 2) Directions: Label each side of the 30° - 60° - 90° triangle with ***hypotenuse, longer side,*** and ***shorter side.***

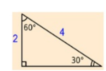
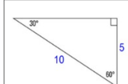


1) How do we know which side is **"longer "**?

2) How do we know which side is **"shorter "**?

2. Use Pythagorean Theorem to solve for length of long leg

(Part 3) Directions: Using the relationship between the shorter leg and the hypotenuse, find the longer leg using the Pythagorean Theorem. LEAVE ANSWERS IN EXACT RADICAL FORM.

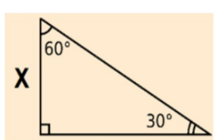
30° - 60° - 90° Triangle	Show your work to find the ***longer leg.***
	
	

(Part 4) Directions:

1) Use the relationship between the shorter leg and the hypotenuse to find the missing shorter leg or hypotenuse.

2) Find the longer leg using the Pythagorean Theorem. **LEAVE ANSWERS IN EXACT RADICAL FORM.**

3. Generalize findings... what is the pattern?!

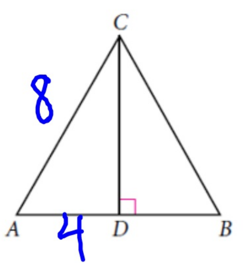


Done? Show teacher.

Investigation: Special Right Triangles

Right Triangle: (30° - 60° - 90°)

(Part 1): ΔABC is equilateral.

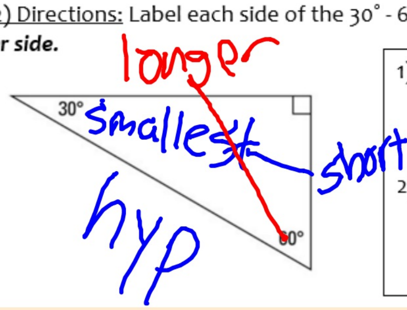


How are AC and AD related? (**Consider the warm-up*)

$AD = \frac{1}{2} AC$ short $= \frac{1}{2}$ hyp

$AC = 2 \cdot AD$

(Part 2) Directions: Label each side of the 30° - 60° - 90° triangle with ***hypotenuse, longer side,*** and ***shorter side.***



1) How do we know which side is ***"longer "***?

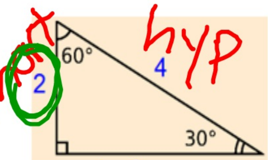
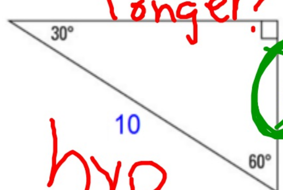
opposite 60°

2) How do we know which side is ***"shorter "***?

opposite 30°

Investigation: Special Right Triangles

(Part 3) Directions: Using the relationship between the shorter leg and the hypotenuse, find the longer leg using the Pythagorean Theorem. LEAVE ANSWERS IN EXACT RADICAL FORM.

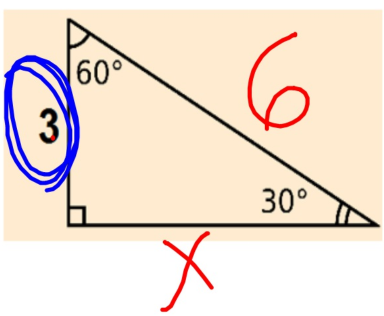
30° - 60° - 90° Triangle	Show your work to find the ***longer leg.***
	$2^2+x^2=4^2$ $4+x^2=16$ $-4 \quad -4$ $x^2=12$ $x=\sqrt{12}$ $x=\sqrt{4\cdot 3}$ $2\sqrt{3}$
	$5^2+x^2=10^2$ $25+x^2=100$ $x^2=75$ $x=\sqrt{75}$ $x=\sqrt{25\cdot 3}$ $x=5\sqrt{3}$

Investigation: Special Right Triangles

<u>(Part 4) Directions:</u>

1) Use the relationship between the shorter leg and the hypotenuse to find the missing shorter leg or hypotenuse.

2) Find the longer leg using the Pythagorean Theorem. **LEAVE ANSWERS IN EXACT RADICAL FORM.**



$3^2 + x^2 = 6^2$

$9 + x^2 = 36$

$x^2 = 27$

$x = \sqrt{27}$

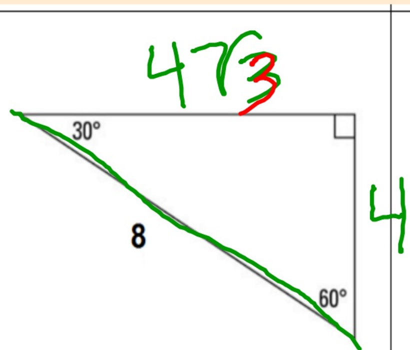
$x = \sqrt{9 \cdot 3}$

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

Investigation: Special Right Triangles

(Part 4) Directions:

1) Use the relationship between the shorter leg and the hypotenuse to find the missing shorter leg or hypotenuse.
2) Find the longer leg using the Pythagorean Theorem. **LEAVE ANSWERS IN EXACT RADICAL FORM.**



$$4^2 + x^2 = 8^2$$

$$16 + x^2 = 64$$

$$x^2 = 48$$

$$x = \sqrt{48} = \sqrt{16 \cdot 3} = \boxed{4\sqrt{3}}$$

Investigation: Special Right Triangles

(Part 5) Generalize:

a) What is the relationship between the ***shorter*** leg and the ***hypotenuse***?

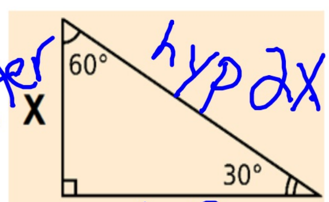
hyp = 2(short) short = $\frac{1}{2}$hyp

b) What is the relationship between the ***shorter*** leg and the ***longer leg***?

long = (short)($\sqrt{3}$)

c) Given the **shorter leg** is **X,** show the relationships of the **30**° - **60**° - **90**° triangle in the triangle below.

shorter



hyp 2x

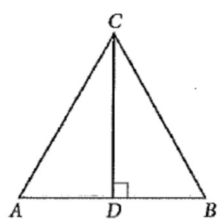
x$\sqrt{3}$

Investigation: Special Right Triangles

Solutions

Right Triangle: (30° - 60° - 90°)

(Part 1): ΔABC is equilateral.



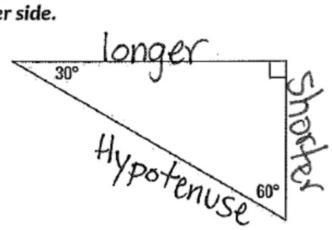
How are AC and AD related? (*Consider the warm-up)

$AC = 2AD$

OR

$AD = \frac{1}{2}AC$

(Part 2) Directions: Label each side of the 30° - 60° - 90° triangle with ***hypotenuse, longer side,*** and ***shorter side.***



1) How do we know which side is **"longer"**?

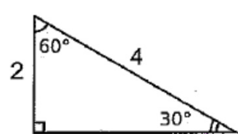
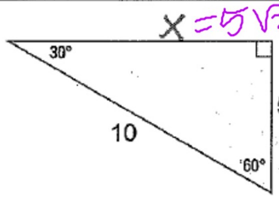
Longer side is OPPOSITE the 60° angle

2) How do we know which side is **"shorter"**?

Shorter side is OPPOSITE the 30° angle

Investigation: Special Right Triangles
Solutions

(Part 3) Directions: Using the relationship between the shorter leg and the hypotenuse, find the longer leg using the Pythagorean Theorem. LEAVE ANSWERS IN EXACT RADICAL FORM.

30° - 60° - 90° Triangle	Show your work to find the ***longer leg.***
 $X = 2\sqrt{3}$	$2^2 + x^2 = 4^2$ $4 + x^2 = 16$ $x^2 = 12$ $x = \sqrt{12}$ $x = \sqrt{4 \cdot 3}$ $\boxed{x = 2\sqrt{3}}$
$X = 5\sqrt{3}$  	$5^2 + x^2 = 10^2$ $25 + x^2 = 100$ $x^2 = 75$ $x = \sqrt{75}$ $x = \sqrt{25 \cdot 3}$ $\boxed{x = 5\sqrt{3}}$

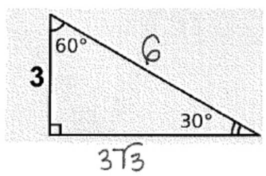
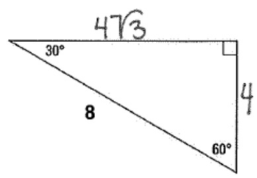
Investigation: Special Right Triangles

Solutions

<u>(Part 4) Directions:</u>

1) Use the relationship between the shorter leg and the hypotenuse to find the missing shorter leg or hypotenuse.
2) Find the longer leg using the Pythagorean Theorem.

LEAVE ANSWERS IN EXACT RADICAL FORM.

	$3^2+x^2=6^2$ $9+x^2=36$ $x^2=27$ $x=\sqrt{27}$ $x=\sqrt{9\cdot 3}$ $\boxed{x=3\sqrt{3}}$
	$4^2+x^2=8^2$ $16+x^2=64$ $x^2=48$ $x=\sqrt{48}$ $x=\sqrt{16\cdot 3}$ $\boxed{x=4\sqrt{3}}$

Investigation: Special Right Triangles

Solutions

(Part 5) Generalize:

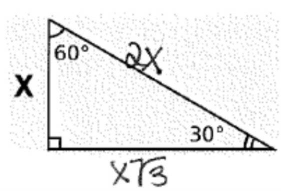
a) What is the relationship between the ***shorter*** leg and the ***hypotenuse***?

Shorter is half the hypotenuse (Hyp = 2·short)

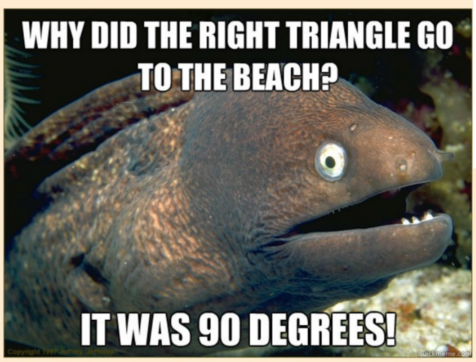
b) What is the relationship between the ***shorter*** leg and the ***longer leg***?

Longer leg is the shorter times $\sqrt{3}$. (Long = $\sqrt{3}$·short)

c) Given the **shorter leg** is **X,** show the relationships of the **30° - 60° - 90°** triangle in the triangle below.



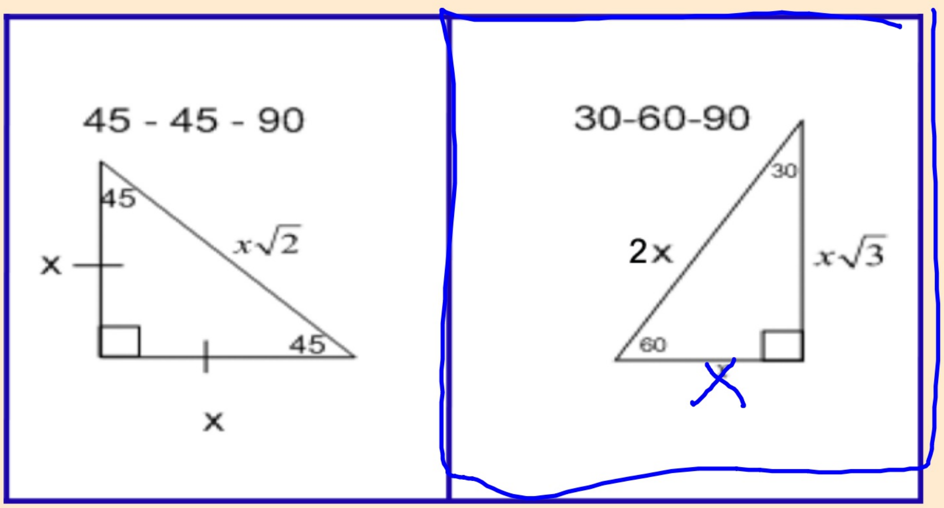
Joke break!


WHY DID THE RIGHT TRIANGLE GO TO THE BEACH?
IT WAS 90 DEGREES!

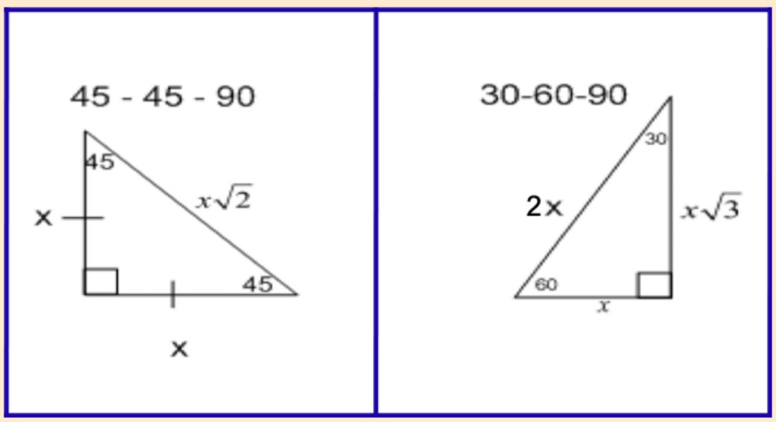

NEVER ARGUE WITH A 90° ANGLE
IT'S ALWAYS RIGHT

Special Right Triangles

Summary: **Draw & record in your notebook.**



Special Right Triangles

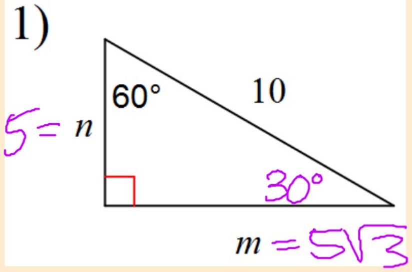


In class practice: 1 - 3, 9

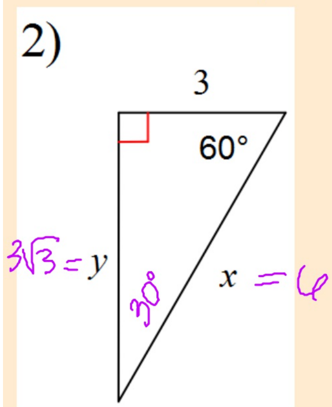
Done? Help others, do more!

Solve for the missing side lengths. Use simplest radical form.

1)

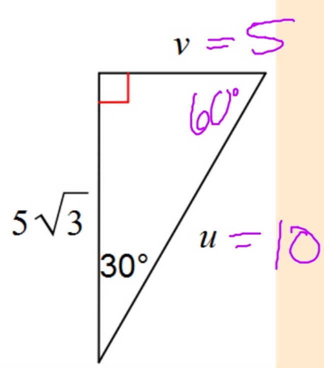


Solve for the missing side lengths.
Use simplest radical form.



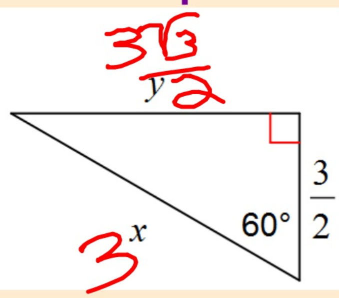
Solve for the missing side lengths.
Use simplest radical form.

3)



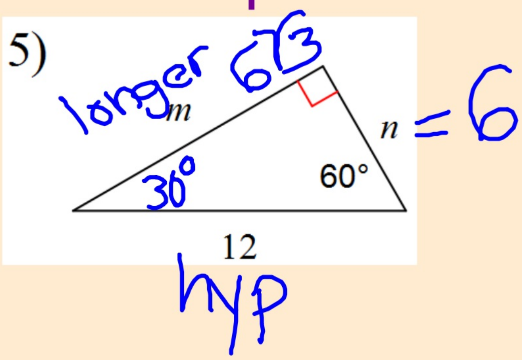
Solve for the missing side lengths.
Use simplest radical form.

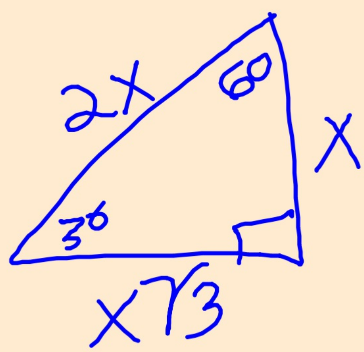
4)



$$x = \frac{3}{2}\left(\frac{2}{1}\right) = \frac{6}{2} = 3$$

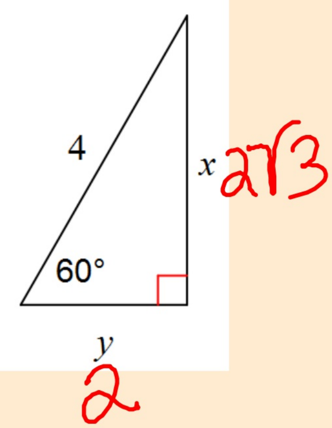
Solve for the missing side lengths.
Use simplest radical form.





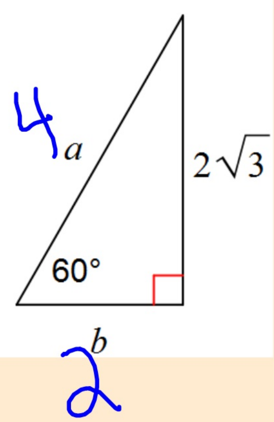
Solve for the missing side lengths. Use simplest radical form.

6)



Solve for the missing side lengths.
Use simplest radical form.

7)

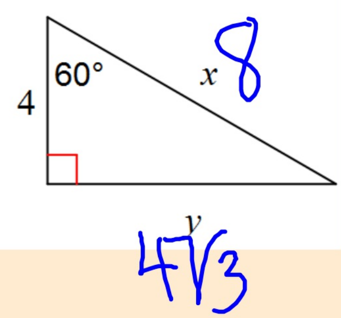


$$\frac{2\sqrt{3}}{\sqrt{3}} = \frac{b\sqrt{3}}{\sqrt{3}}$$

$$\boxed{2 = b}$$

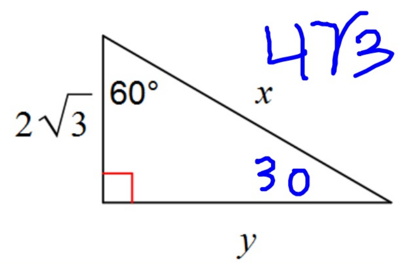
Solve for the missing side lengths.
Use simplest radical form.

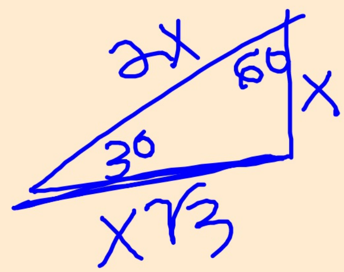
8)



Solve for the missing side lengths. Use simplest radical form.

9)



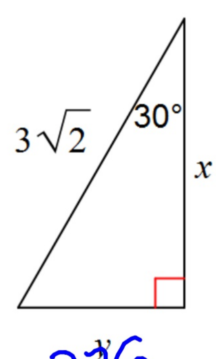


$y = 2\sqrt{3}(\sqrt{3})$

$\boxed{y = 6}$

Solve for the missing side lengths.
Use simplest radical form.

10)



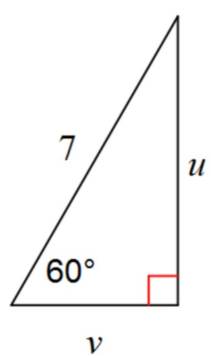
$y = \frac{3\sqrt{2}}{2}$

$$x = \frac{3\sqrt{2}}{2}\left(\frac{\sqrt{3}}{1}\right)$$

$$\boxed{x = \frac{3\sqrt{6}}{2}}$$

Solve for the missing side lengths.
Use simplest radical form.

11)

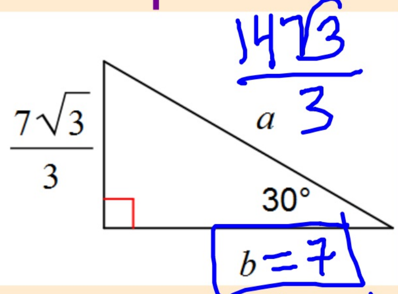


$\frac{7}{2}\sqrt{3}$ or $\frac{7\sqrt{3}}{2}$

$\frac{7}{2}$

Solve for the missing side lengths.
Use simplest radical form.

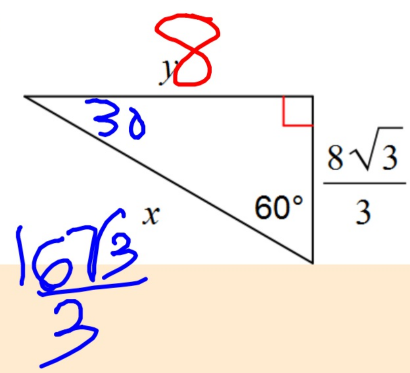
12)



$$\frac{7\sqrt{3}}{3}\left(\frac{\sqrt{3}}{1}\right) = \frac{7\cdot 3}{3} = \boxed{7}$$

Solve for the missing side lengths.
Use simplest radical form.

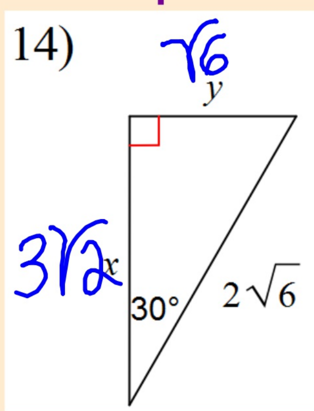
13)



$$\frac{8\sqrt{3}}{3} \cdot \frac{\sqrt{3}}{1} = \frac{8 \cdot 3}{3}$$

$$8 = \frac{24}{3}$$

Solve for the missing side lengths.
Use simplest radical form.



$y = \frac{1}{2}(2\sqrt{6}) = \sqrt{6}$

$x = \sqrt{6}(\sqrt{3})$

$x = \sqrt{18}$

$x = \sqrt{9 \cdot 2}$

$x = 3\sqrt{2}$

Solutions

1) $m = 5\sqrt{3},\ n = 5$

2) $x = 6,\ y = 3\sqrt{3}$

3) $u = 10,\ v = 5$

4) $x = 3,\ y = \frac{3\sqrt{3}}{2}$

5) $m = 6\sqrt{3},\ n = 6$

6) $x = 2\sqrt{3},\ y = 2$

7) $a = 4,\ b = 2$

8) $x = 8,\ y = 4\sqrt{3}$

9) $x = 4\sqrt{3},\ y = 6$

10) $x = \frac{3\sqrt{6}}{2},\ y = \frac{3\sqrt{2}}{2}$

11) $u = \frac{7\sqrt{3}}{2},\ v = \frac{7}{2}$

12) $a = \frac{14\sqrt{3}}{3},\ b = 7$

13) $x = \frac{16\sqrt{3}}{3},\ y = 8$

14) $x = 3\sqrt{2},\ y = \sqrt{6}$