Math Summer Work 2019

Attached are three packets to be completed over the summer in preparation for Geometry. The three packets are:

- Right Triangles
- Areas of Quadrilaterals
- Simplifying and Rationalizing Radical Expressions

This assignment is due on the first day of school in the fall.

If you have any questions about any of these problems, you can email, Mr. Riley, Mr. Saad, or Mr. Hussein.

Don't wait to do this work at the last minute or even all at once. It's best if you spread out the time you work on these problems.

Summer Work 2019 Right Triangles Name

Show your work and circle your answers.

The Pythagorean Theorem

Find the missing side of each right triangle. If the answer isn't an integer give it in simplified radical form. Circle your answer.

1. One leg is 20 and the hypotenuse is 24

2. The legs are 15 and 12

Is each triangle a right triangle? Show work and explain your answer.

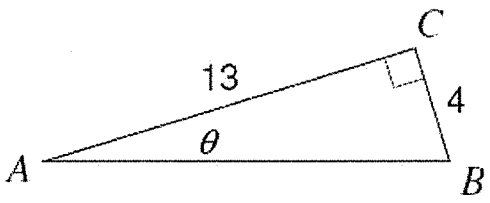
3. Side lengths: 8, 24, 35

4. 12, 35, 37

Right Triangle Trigonometry

Find the lengths of each missing side or angle to the nearest hundredth. Circle your answers.

5.



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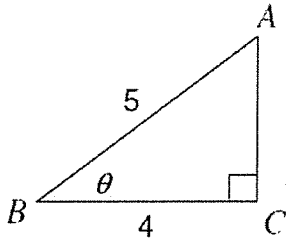

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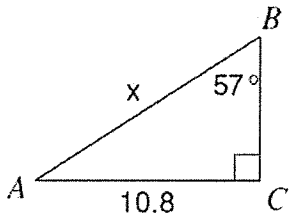

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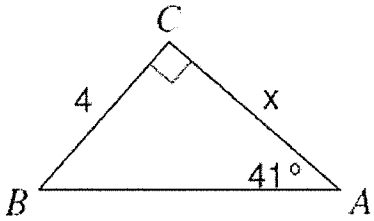


Each of the triangles below is either an acute triangle or an obtuse triangle. Research how you can use the Pythagorean Theorem to determine which type of triangle each is. Show your work and state if each triangle is Actue or Obtuse.

9. 7, 24, 27

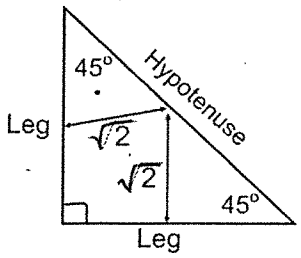
10. 33, 56, 62

Trigonometry Prerequisite: Special Right Triangles

Special Right Triangles: 45° - 45° - 90°

Hypotenuse = Leg * $\sqrt{2}$

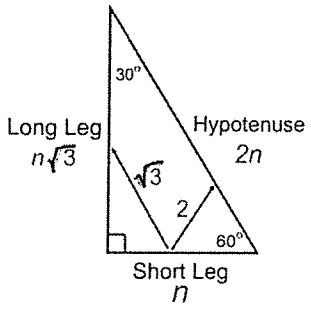
Leg = $\frac{\text{hypotenuse}}{\sqrt{2}}$



Special Right Triangles: 30° - 60° - 90°

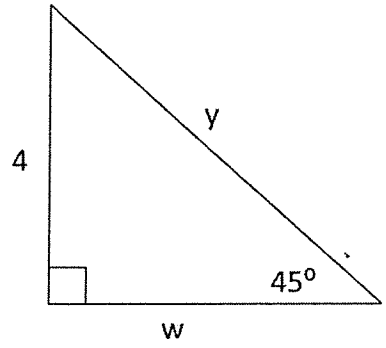
Hypotenuse = 2 * Short Leg

Long Leg = Short Leg * $\sqrt{3}$



FOR EACH Δ FIND W AND Y IS SIMPLEST RADICAL FORM. SHOW WORK AND CIRCLE ANSWERS.

(1.)



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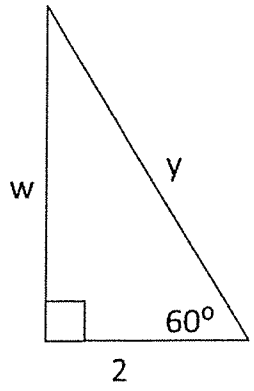

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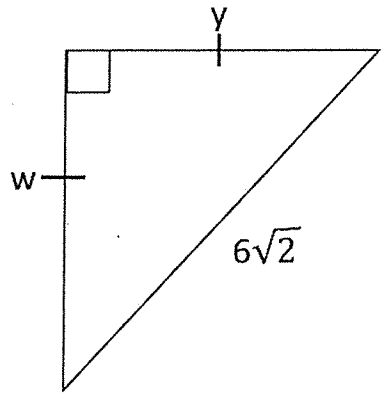

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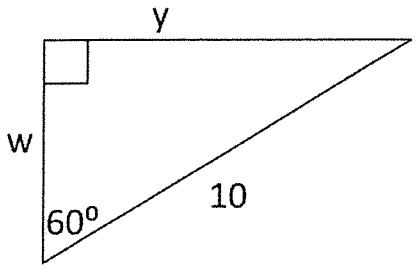

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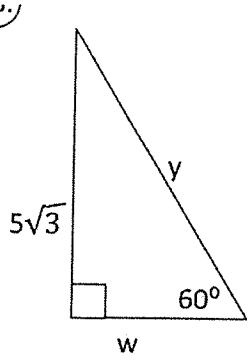

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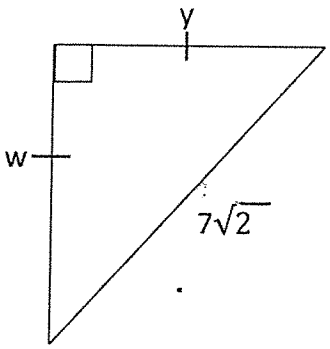

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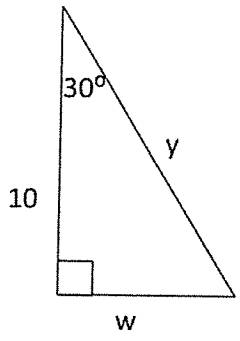

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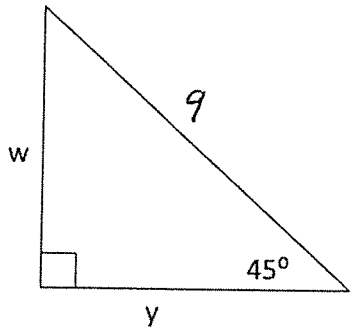

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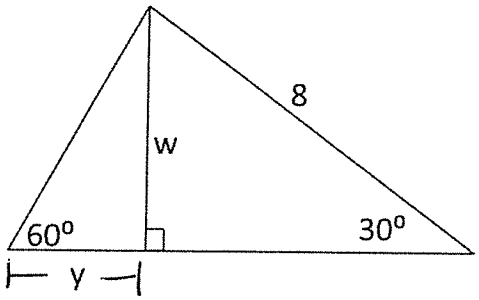

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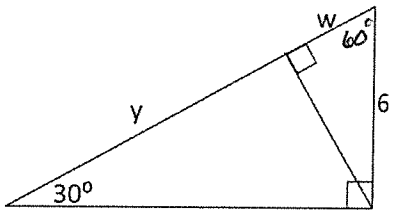

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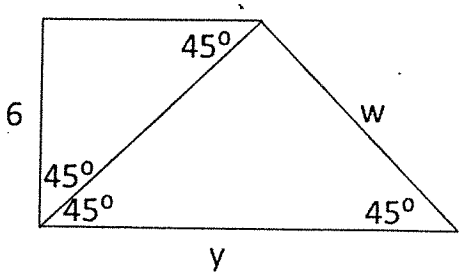

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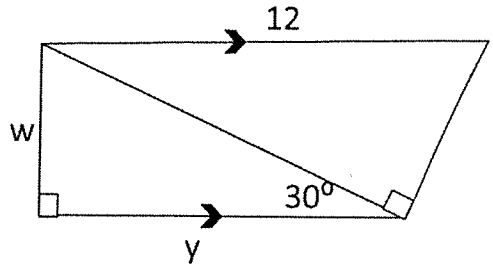

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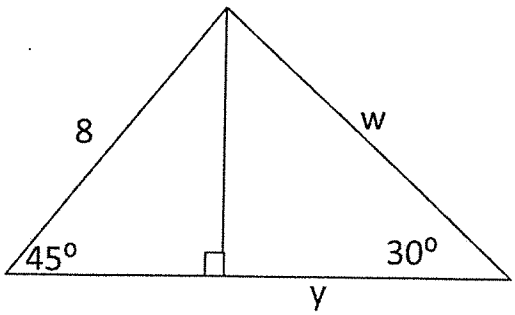

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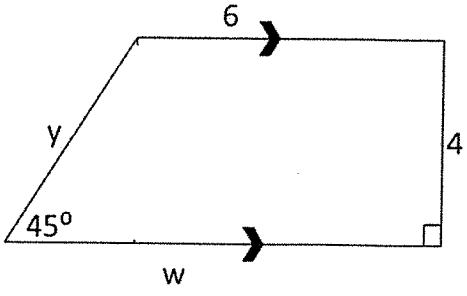
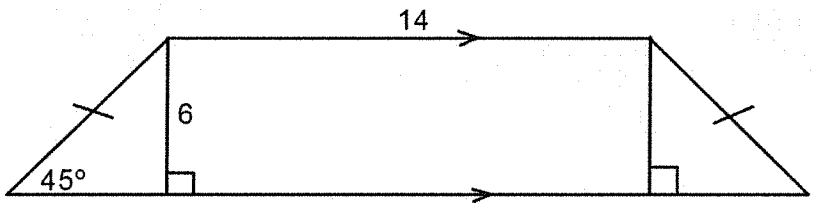


(2) Summer Work 2019 Area of Quadrilaterals Name

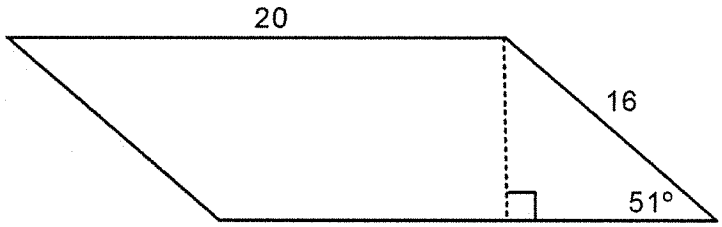
Use the formulas on the attached page to find the area of each figure. Show your work and circle your answers. Round answer to the nearest tenth where necessary.

1. Trapezoid.



Area =

2. Parallelogram.

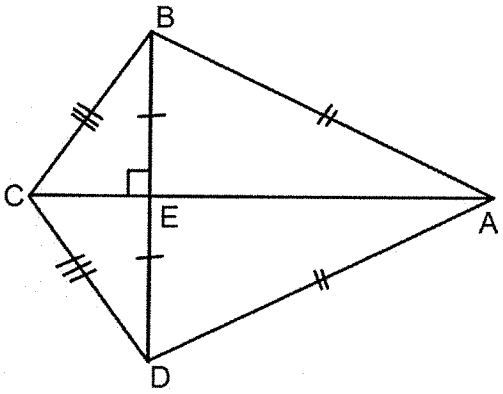


Area =

3. Kite.

BD = 10

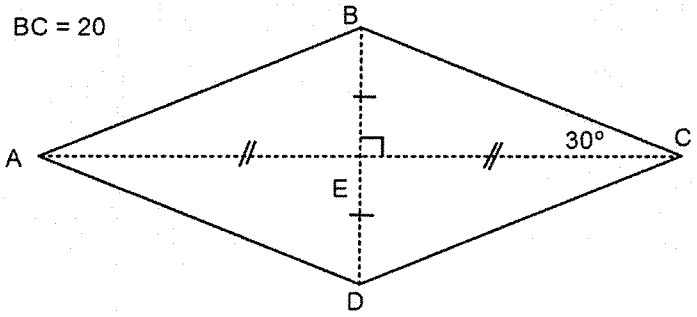
AB = 13



Area =

4. Rhombus.

BC = 20

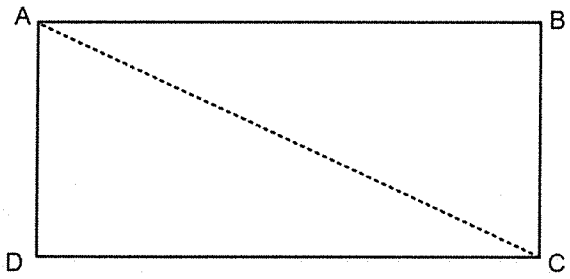


Area =

5. Rectangle.

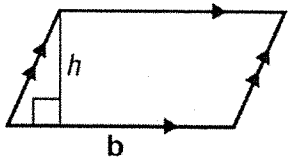
AB = 72

AC = 78



Area =

Theorem 2 (Area of a Parallelogram) :

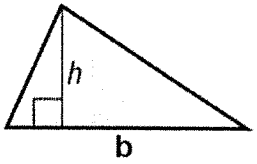


The area of a parallelogram is the product of a base and its corresponding height.

That is,

$$\text{Area} = b \cdot h$$

Theorem 3 (Area of a Triangle) :

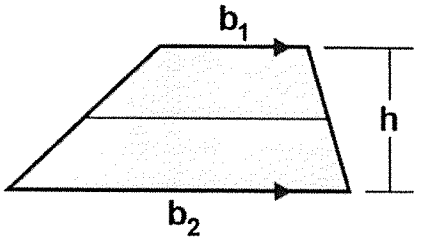


The area of a triangle is one half the product of a base and its corresponding height.

That is,

$$\text{Area} = 1/2 \cdot b \cdot h$$

Theorem 4 (Area of a Trapezoid) :

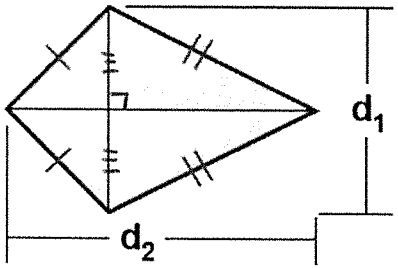


The area of a trapezoid is one half the product of the height and sum of the bases.

That is,

$$\text{Area} = 1/2 \cdot h \cdot (b_1 + b_2)$$

Theorem 5 (Area of a Kite) :

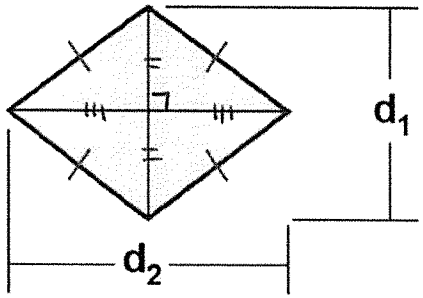


The area of a kite is one half the product of the lengths of its diagonals.

That is,

$$\text{Area} = 1/2 \cdot d_1 \cdot d_2$$

diagonal d_1 is bisected by diagonal d_2



The area of a rhombus is one half the product of the lengths of its diagonals.

That is,

$$\text{Area} = 1/2 \cdot d_1 \cdot d_2$$

diagonals d_1 & d_2 bisect each other.

3

SIMPLIFYING RADICAL EXPRESSIONS

Perfect Squares: 1, 4, 9, 16, 25, ____, ____, ____, ____, ____, ____, 144…

x^2, x^4, x^6, ____, ____... Exponents must be EVEN.

$\sqrt{25}$ is read "the square root of 25".

$\sqrt{25} = 5$ because $5^2 = 25$ $\sqrt{36} = 6$ because $6^2 = 36$ $\sqrt{100} = 10$ $\sqrt{49} = 7$

$\sqrt{a^6} = a^3$ because $(a^3)^2 = a^6$ $\sqrt{m^{16}} = m^8$ because $(m^8)^2 = m^{16}$ $\sqrt{y^{10}} = y^5$ $\sqrt{a^2} = a$

Hint: Divide the exponent by 2.

In the expression $\sqrt{a}$, the $\sqrt{\ }$ is called the radical and a is called the radicand.

Simplify (Simplifying Radicals that are not Perfect Squares): EXAMPLES

1. $\sqrt{20} = \sqrt{4} \cdot \sqrt{5} = 2\sqrt{5}$
2. $\sqrt{27} = \sqrt{9}\sqrt{3} = 3\sqrt{3}$
3. $\sqrt{48} = \sqrt{16}\sqrt{3} = 4\sqrt{3}$
4. $\sqrt{45} = \sqrt{9}\sqrt{5} = 3\sqrt{5}$
5. $\sqrt{12} = \sqrt{4}\sqrt{3} = 2\sqrt{3}$
6. $\sqrt{50} = \sqrt{25}\sqrt{2} = 5\sqrt{2}$
7. $\sqrt{a^5} = \sqrt{a^4}\sqrt{a} = a^2\sqrt{a}$
8. $\sqrt{x^9} = \sqrt{x^8}\sqrt{x} = x^4\sqrt{x}$
9. $\sqrt{x^3} = \sqrt{x^2}\sqrt{x} = x\sqrt{x}$

Simplify: * DO THESE *

1. $\sqrt{18}$
2. $\sqrt{125}$
3. $\sqrt{72}$
4. $\sqrt{180}$
5. $\sqrt{a^3}$
6. $\sqrt{b^7}$
7. $\sqrt{m^{11}}$
8. $\sqrt{75x^7y^5}$
9. $\sqrt{27a^{11}b^7}$
10. $\sqrt{32a^7b^4}$
11. $\sqrt{9a^8}$
12. $\sqrt{45a^7}$
13. $\sqrt{36x^2y^6}$
14. $\sqrt{12x^{20}y^8}$
15. $-\sqrt{200}$
16. $\sqrt{196}$
17. $\sqrt{63x^4y}$
18. $\sqrt{6x^3}$
19. $\sqrt{100x^5y}$
20. $\sqrt{80x^{100}y^{49}}$

Simplifying Radical Expressions: Dividing and rationalizing the Denominator

$\frac{6}{3} = 2$ $\quad \frac{\sqrt{6}}{\sqrt{2}} = \sqrt{3}$ $\quad \frac{\sqrt{6}}{2} = \frac{\sqrt{6}}{2}$ $\quad \frac{12\sqrt{6}}{2} = 6\sqrt{6}$ $\quad \frac{12\sqrt{6}}{\sqrt{2}} = 12\sqrt{3}$

EXAMPLES

Simplest form for fractions with $\sqrt{\ }$

1. No perfect square factor under $\sqrt{\ }$ ex. $\sqrt{75} = \sqrt{25}\sqrt{3} = 5\sqrt{3}$
2. No fractions under a $\sqrt{\ }$ ex. $\sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{\sqrt{4}} = \frac{\sqrt{3}}{2}$
3. No $\sqrt{\ }$ in a denominator ex. $\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{\sqrt{9}} = \frac{2\sqrt{3}}{3}$
4. Must be reduced ex. $\frac{8\sqrt{5}}{2} = 4\sqrt{5}$

5. $\frac{\sqrt{33}}{\sqrt{22}} = \frac{\sqrt{3}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{6}}{2}$

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11) $\frac{\sqrt{8}}{\sqrt{7}}$

12) $\frac{7}{8\sqrt{7}}$

* DO THESE PROBLEMS *

13) $\frac{\sqrt{2}}{\sqrt{6}}$

14) $\frac{\sqrt{21}}{\sqrt{15}}$

15) $\frac{\sqrt{3}}{6\sqrt{7}}$

16) $\frac{\sqrt{5}}{\sqrt{3}}$

17) $\frac{\sqrt{15}}{3\sqrt{6}}$

18) $\frac{\sqrt{8}}{2\sqrt{7}}$