Use the coordinates of Quadrilateral ABCD to determine the most precise name: Parallelogram, Rhombus, Rectangle or just quad?

A(10,-2) B(8,3) C(-11,-1) D(-9,-6)

mdpt of diagonals

AC: $\left(\frac{10+-11}{2}, \frac{-2+-1}{2}\right)$

$= \left(-\frac{1}{2}, -\frac{3}{2}\right)$

BD: $\left(\frac{8+-9}{2}, \frac{3+-6}{2}\right)$

$\left(-\frac{1}{2}, -\frac{3}{2}\right)$

ABCD is a ||-gram b/c diag bisect.

slope of diag

AC $m = \frac{-1--2}{-11--10}$

$m = \frac{1}{-1}$

BD $m = \frac{3--6}{8--9}$

$m = \frac{9}{17}$

ABCD is NOT a Rhombus b/c diag not ⊥

length of diag

AC $= \sqrt{(10--11)^2+(-2--1)^2}$

$= \sqrt{21^2+(-1)^2}$

$= \sqrt{442}$

BD $= \sqrt{(8--9)^2+(3--6)^2}$

$= \sqrt{17^2+9^2}$

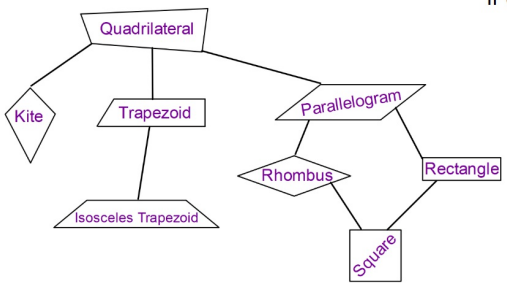
$= \sqrt{370}$

ABCD is NOT A Rectangle b/c diag not ≅

Therefore, ABCD is just a parallelogram.

What is true about a Square?

Quadrilateral Hierarchy:



All squares are:
Rhombuses, Rectangles, ||-grams, and Quadrilaterals!

Therefore, a Square has the properties of all of these figures... at the same time.

A Square is:
a Parallelogram, a Rhombus,
and a Rectangle all wrapped into one figure!

A Square has:

- 4 sides
- opp sides ||
- opp side ≅
- opp angles ≅
- diag bisect each other
- diag perpendicular
- diag ≅
- both diag bisect 2 angles
- four ≅sides
- four rt angles

Quadrilateral Booklet

Square

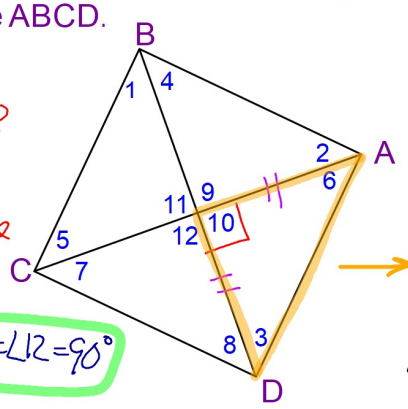
Def: Quadrilateral with rt. angles and four ≅ sides

- All properties of a ||-gram

PLUS

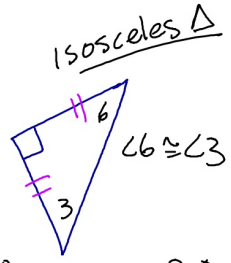
- All properties of a Rhombus & Rectangle

Find the measure of all the missing numbered angles of square ABCD.



Since a sq is also a Rhombus the diagonals are ⊥

$\angle 9 = \angle 10 = \angle 11 = \angle 12 = 90°$



$90° + \angle 3 + \angle 6 = 180°$

$\angle 3 + \angle 6 = 90°$

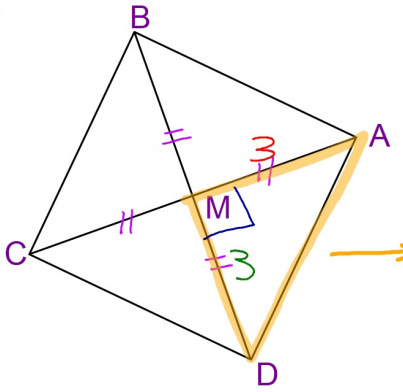
$\div 2$

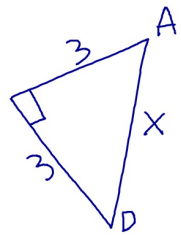
$\angle 3 = \angle 6 = 45°$

THIS will Be also true for the remaining ∠s

$\angle 1 = \angle 2 = \angle 3 = \angle 4 = \angle 5 = \angle 6 = \angle 7 = \angle 8 = 45°$

AM = 3. Find the EXACT length of each side of square ABCD.





$X^2 = 3^2 + 3^2$

$X^2 = 9 + 9$

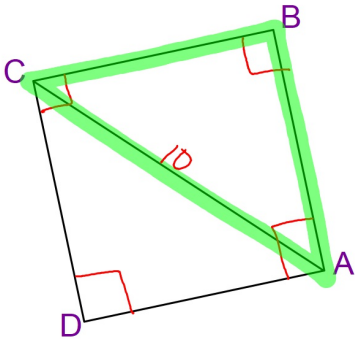
$X^2 = 18$

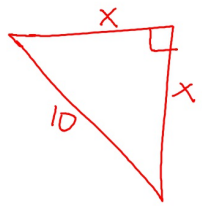
$X = \sqrt{18} = \sqrt{9 \cdot 2}$

$X = 3\sqrt{2}$

each side $= 3\sqrt{2}$

In square ABCD the length of AC = 10. Find the length of each side to the nearest hundredth.





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

$\frac{100}{2} = \frac{2x^2}{2}$

$50 = x^2$

$X = \sqrt{50} = \sqrt{25 \cdot 2}$

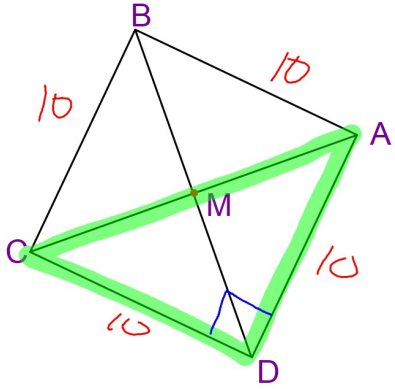
$X = 5\sqrt{2}$

each side $= 5\sqrt{2}$

The perimeter of square ABCD is 40. Find the length of each diagonal to the nearest hundredth.

perimeter = 40

each side $= \frac{40}{4} = 10$



$10^2 + 10^2 = AC^2$

$\sqrt{200} = \sqrt{AC^2}$

$AC = \sqrt{200} = \sqrt{100 \cdot 2}$

$A = 10\sqrt{2}$

How do you tell if a quadrilateral is a Square?

You can start with showing the quadrilateral is a parallelogram.

Since a Square is both a Rhombus and a Rectangle it must have all the properties of both these too.

Once you've established the fact the figure is a Parallelogram you need to do either of the following:

- Show that the diagonals are congruent AND perpendicular.

OR

- Show that it has four right angles AND four congruent sides.

Quadrilateral Booklet

Square	Proving a Quad is a Square:
Quadrilateral with rt. angles and four ≅ sides • All properties of a ||-gram PLUS • All properties of a Rhombus & Rectangle	1. Show it is a ||-gram with ≅ & ⊥ diagonals 2. Show it's a quard with four right angles and four ≅ sides.

You are now ready for Quiz #1

Sec 6-1 to 6-4