Rectangles, Rhombuses, and Squares

Geometry

Mr. Bower

Rectangle

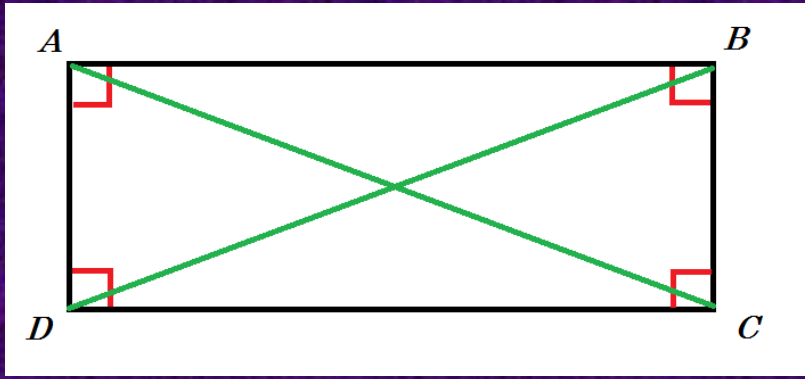
- A rectangle is a quadrilateral with four right angles

- All rectangles are parallelograms

Rectangle

- The diagonals of a rectangle are congruent

- In this diagram, $\overline{AC} \cong \overline{BD}$

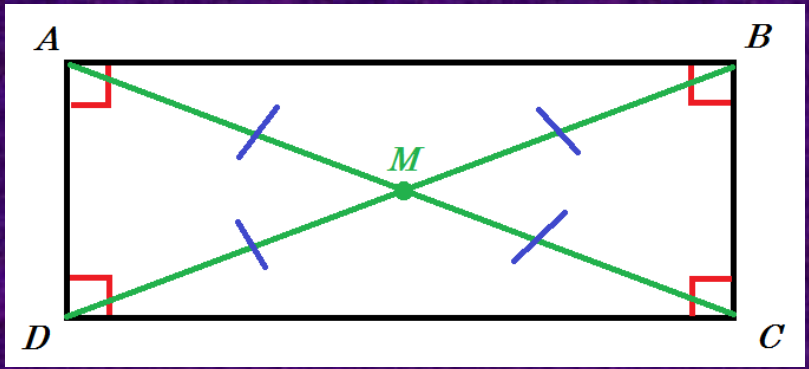


Rectangle

- The diagonals of a rectangle are congruent

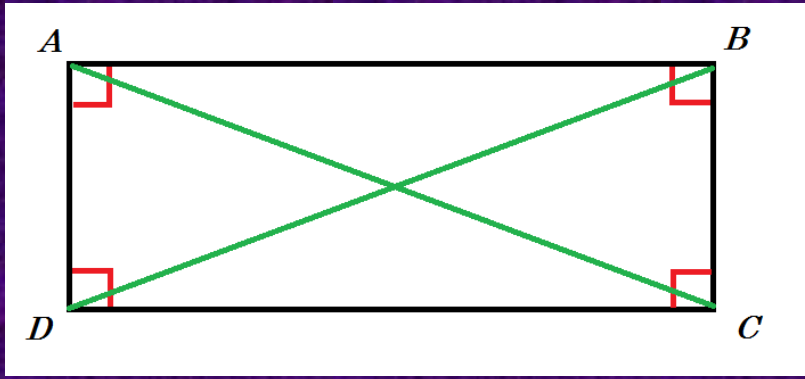
- As a result, $\overline{AM} \cong \overline{BM} \cong \overline{CM} \cong \overline{DM}$

(Remember - the diagonals of any parallelogram bisect each other)



Rectangle – Example 1

- If $AC = 20$ and $BD = 3x - 1$, what is x?



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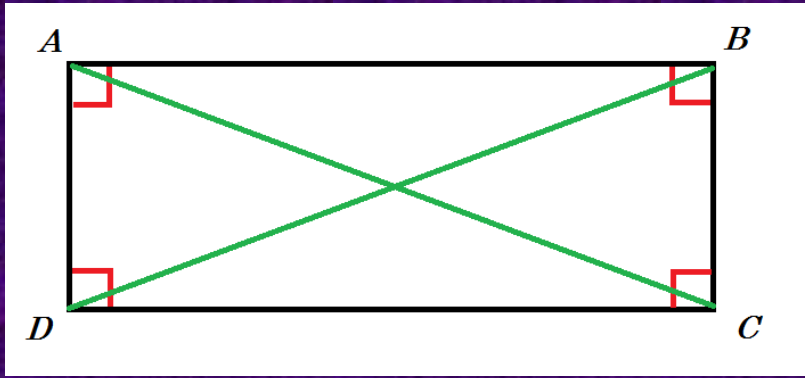


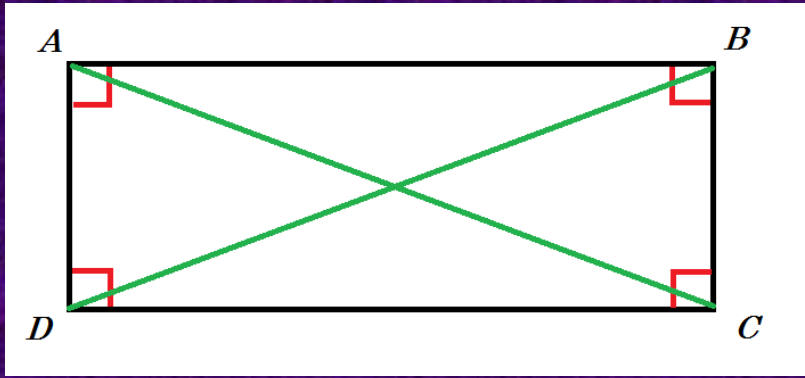
$$AC = BD$$

so

$$20 = 3x - 1$$

Rectangle – Example 1

- If $AC = 20$ and $BD = 3x - 1$, what is x?



$$AC = BD$$

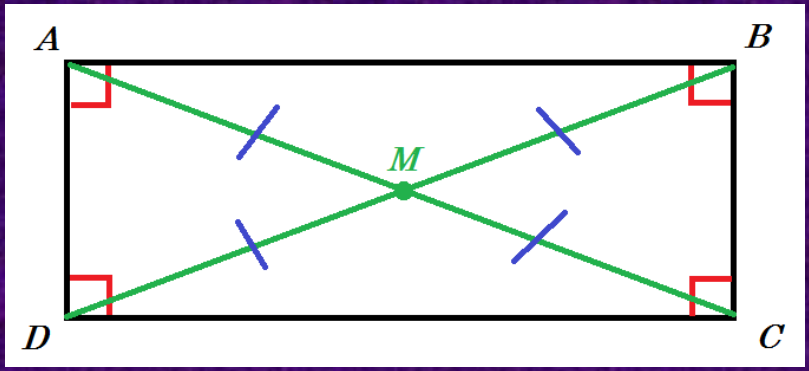
so

$$20 = 3x - 1$$

$$x = 7$$

Rectangle – Example 2

- If $AM = 14$ and $BD = 7x$, what is x?



Rectangle – Example 2

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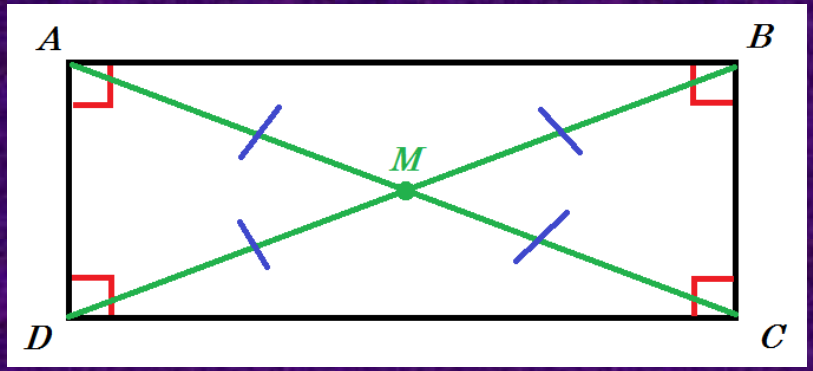
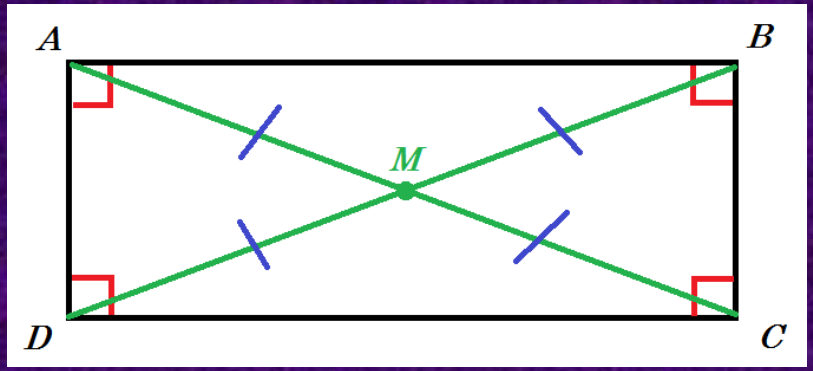


If $AM = 14$, then $AC = 28$

Rectangle – Example 2

- If $AM = 14$ and $BD = 7x$, what is x?



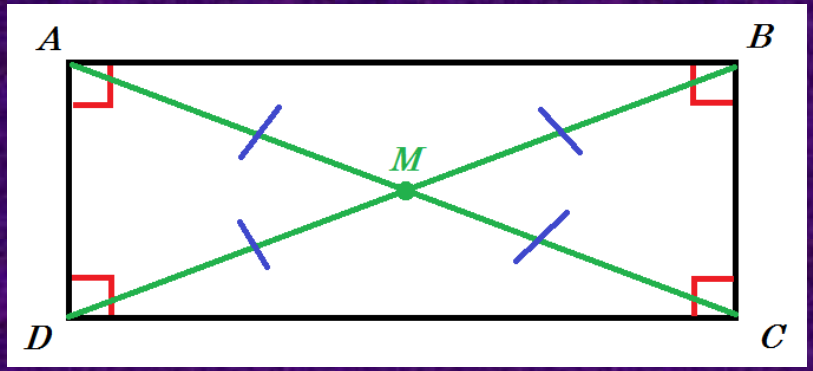
If $AM = 14$, then

$AC = 28$

$AC = BD$

Rectangle – Example 2

- If $AM = 14$ and $BD = 7x$, what is x?



If $AM = 14$, then

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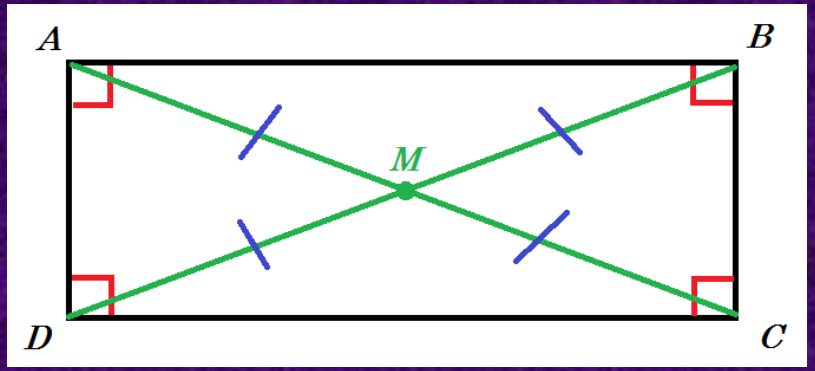
Rectangle – Example 2

- If $AM = 14$ and $BD = 7x$, what is x?



If $AM = 14$, then
$AC = 28$

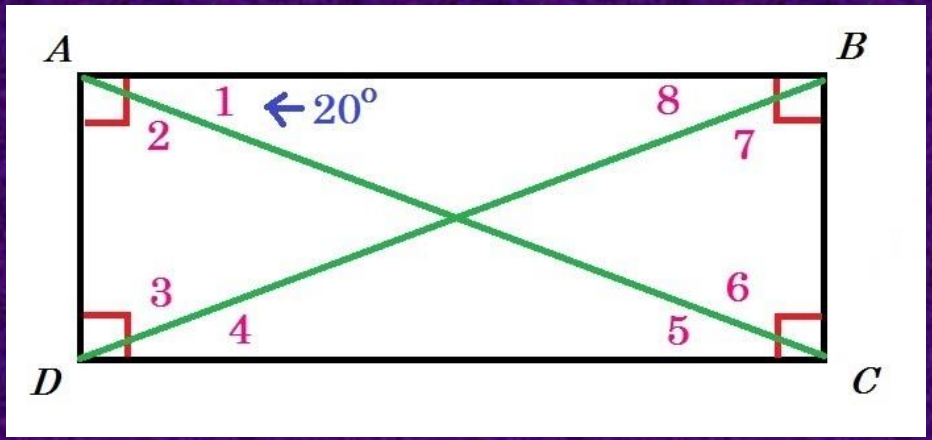
$28 = 7x$

$x = 4$

Rectangle – Example 3

- If $m\measuredangle 1 = 20$, then…

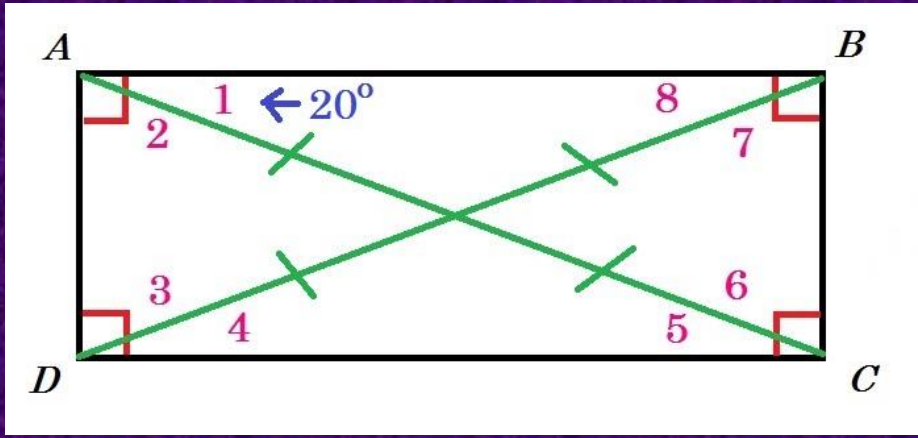
$m\measuredangle 2 = ???$
$m\measuredangle 3 = ???$
$m\measuredangle 4 = ???$
$m\measuredangle 5 = ???$
$m\measuredangle 6 = ???$
$m\measuredangle 7 = ???$
$m\measuredangle 8 = ???$



Rectangle – Example 3

- If $m\measuredangle 1 = 20$, then…

$m\measuredangle 2 = ???$
$m\measuredangle 3 = ???$
$m\measuredangle 4 = ???$
$m\measuredangle 5 = ???$
$m\measuredangle 6 = ???$
$m\measuredangle 7 = ???$
$m\measuredangle 8 = ???$

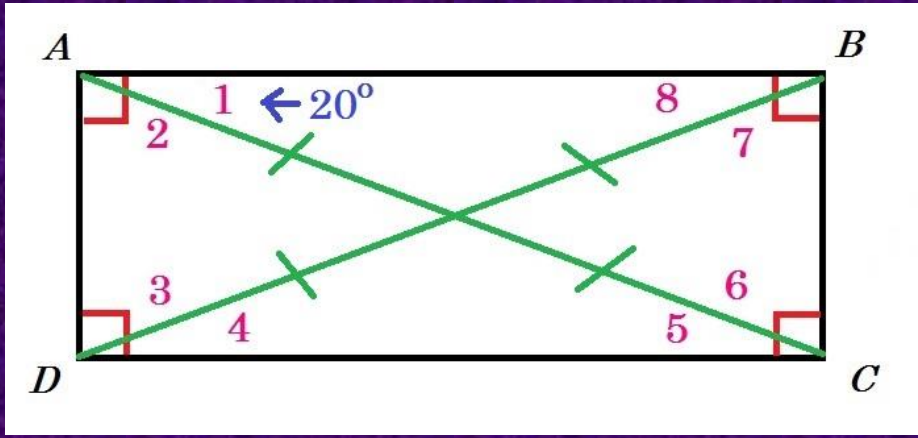


Do you see the isosceles triangles?

Rectangle – Example 3

- If $m\measuredangle 1 = 20$, then…

$m\measuredangle 2 = 70°$
$m\measuredangle 3 = 70°$
$m\measuredangle 4 = 20°$
$m\measuredangle 5 = 20°$
$m\measuredangle 6 = 70°$
$m\measuredangle 7 = 70°$
$m\measuredangle 8 = 20°$

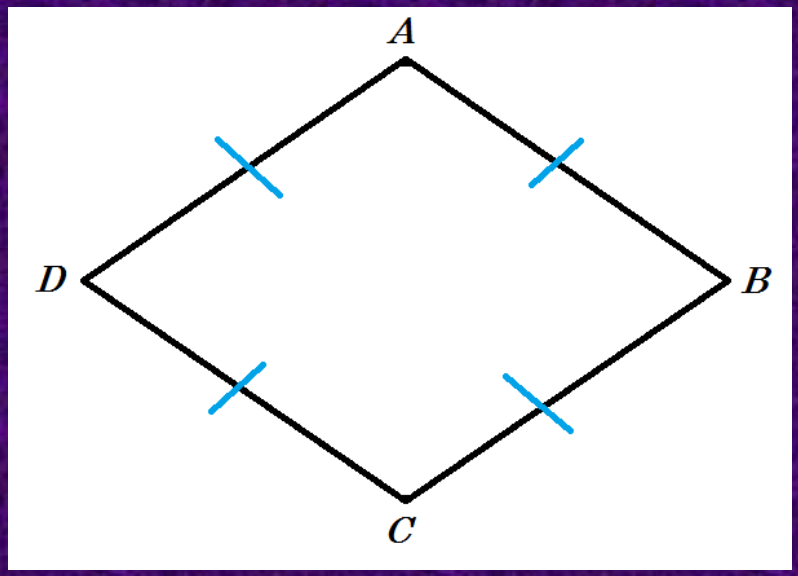


Do you see the isosceles triangles?

Rhombus

- A rhombus is a quadrilateral with four congruent sides

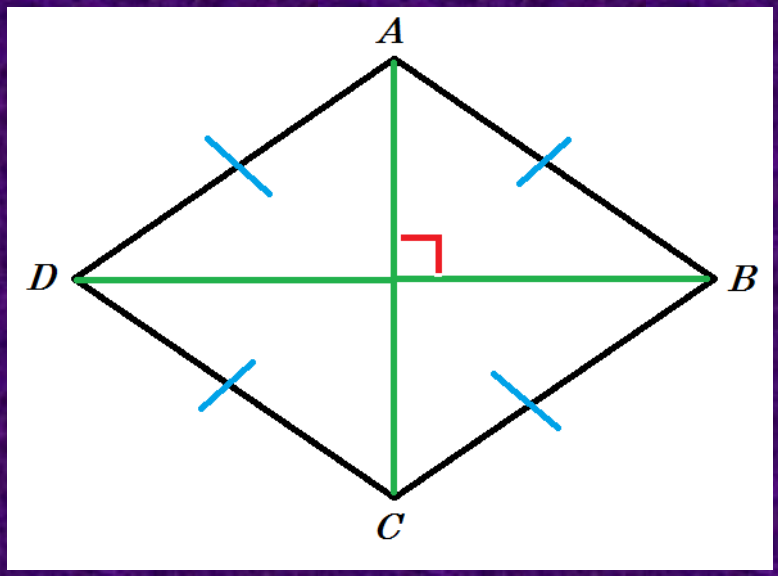
- All rhombuses are parallelograms



Rhombus

- The diagonals of a rhombus are perpendicular to each other

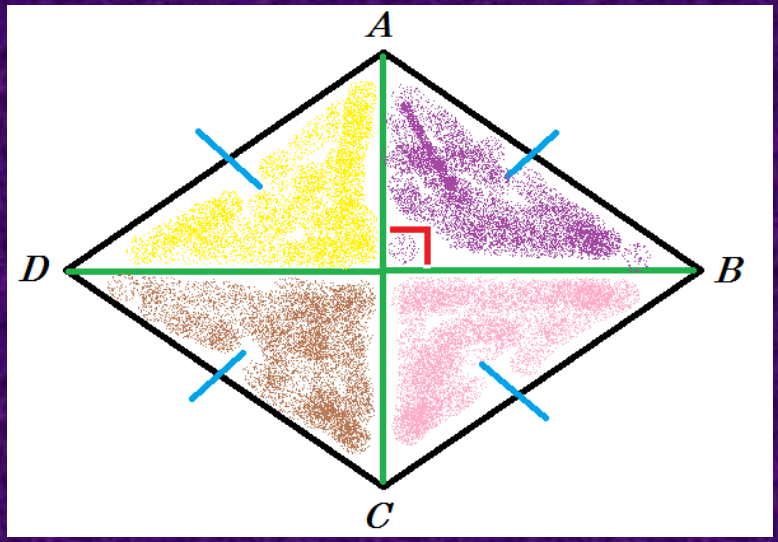
- In this diagram, $\overline{AC} \perp \overline{BD}$



Rhombus

- The diagonals of a rhombus create <u>four congruent triangles</u>

- Do you see the congruent triangles in the diagram?



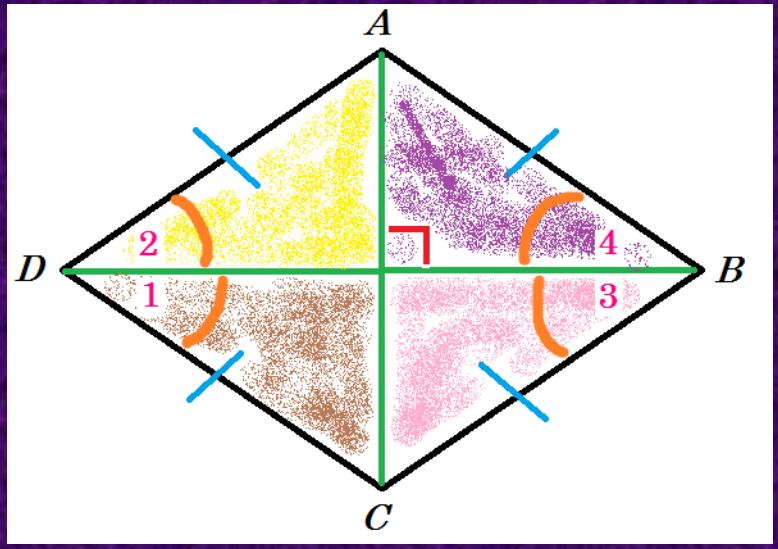
Rhombus

- Each diagonal in a rhombus bisects two opposite angles

- In this diagram, $\overline{BD}$ bisects both $\measuredangle B$ & $\measuredangle D$,

so

$\measuredangle 1 \cong \measuredangle 2 \cong \measuredangle 3 \cong \measuredangle 4$



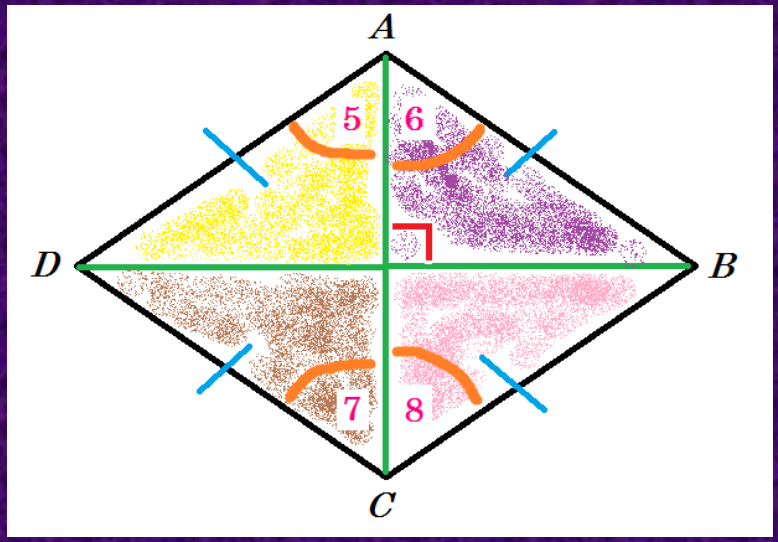
Rhombus

- Each diagonal in a rhombus bisects two opposite angles

- In this diagram, $\overline{AC}$ bisects both $\measuredangle A$ & $\measuredangle C$,

so

$\measuredangle 5 \cong \measuredangle 6 \cong \measuredangle 7 \cong \measuredangle 8$



Rhombus – Example 1

- If $m\measuredangle 1 = 40°$, then…

$m\measuredangle 2 = ???$

$m\measuredangle 3 = ???$

$m\measuredangle 4 = ???$

$m\measuredangle 5 = ???$

$m\measuredangle 6 = ???$

$m\measuredangle 7 = ???$

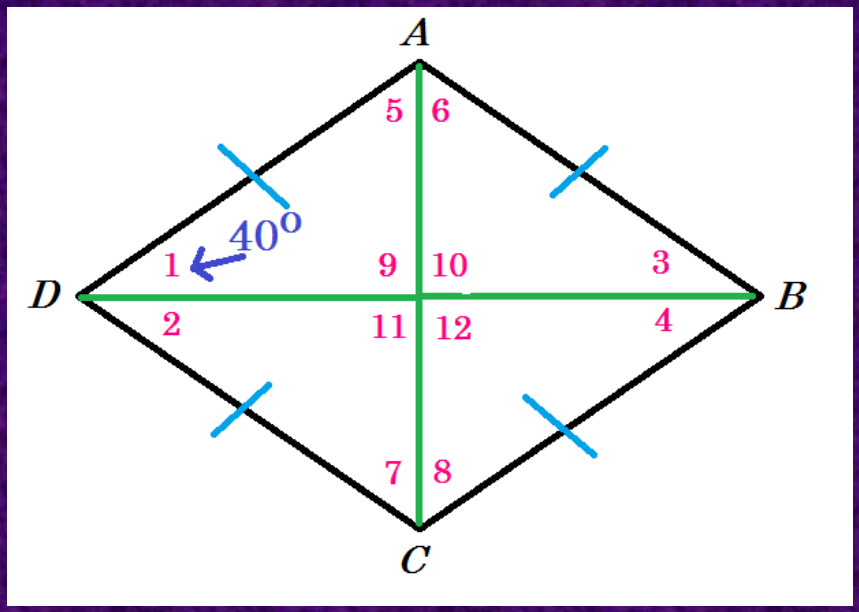
$m\measuredangle 8 = ???$

$m\measuredangle 9 = ???$

$m\measuredangle 10 = ???$

$m\measuredangle 11 = ???$

$m\measuredangle 12 = ???$



Rhombus – Example 1

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$m\measuredangle 9 = ???$

$m\measuredangle 10 = ???$

$m\measuredangle 11 = ???$

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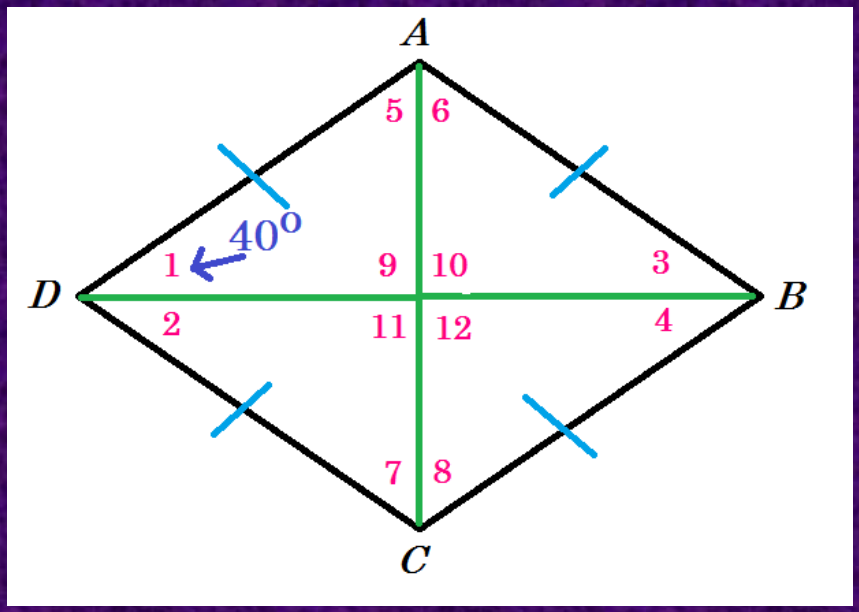
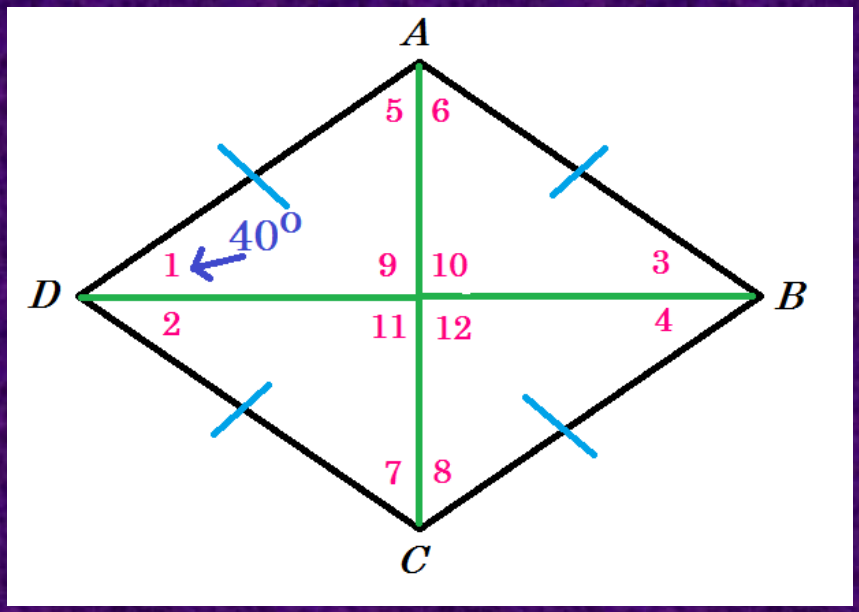


What do you know about $\measuredangle 9, \measuredangle 10, \measuredangle 11, \& \measuredangle 12$?

Rhombus – Example 1

- If $m\measuredangle 1 = 40°$, then…

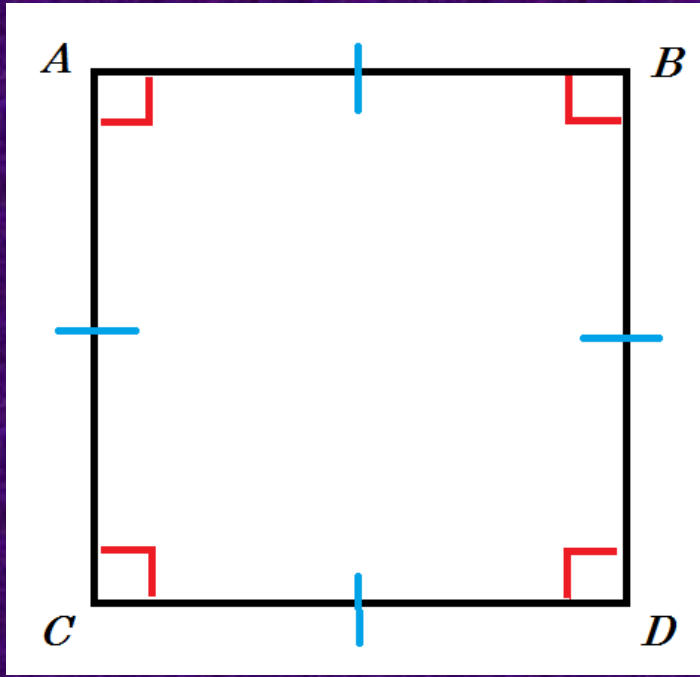
$m\measuredangle 2 = 40°$
$m\measuredangle 3 = 40°$
$m\measuredangle 4 = 40°$
$m\measuredangle 5 = 50°$
$m\measuredangle 6 = 50°$
$m\measuredangle 7 = 50°$
$m\measuredangle 8 = 50°$
$m\measuredangle 9 = 90°$
$m\measuredangle 10 = 90°$
$m\measuredangle 11 = 90°$
$m\measuredangle 12 = 90°$



Square

- A square is a quadrilateral with four right angles & four congruent sides

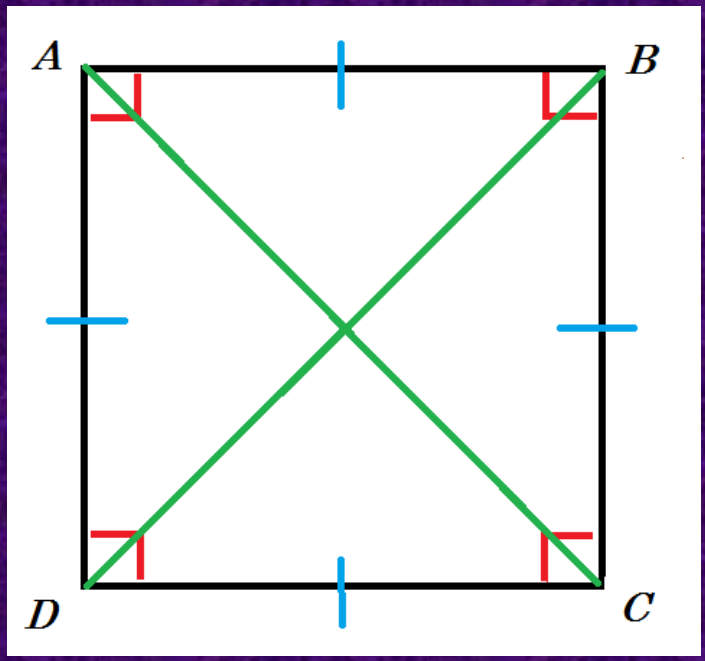
- All squares are parallelograms



Square

- A square is a quadrilateral with four right angles & four congruent sides

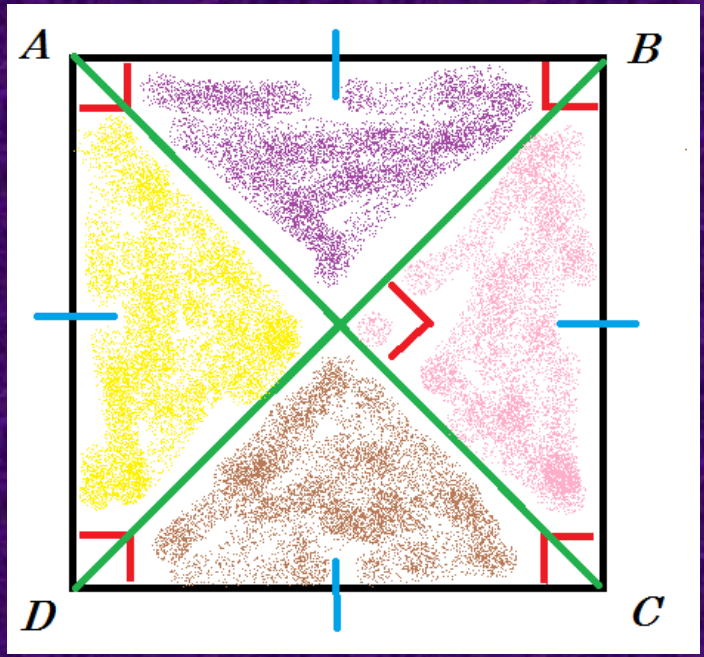
- All squares are rectangles, so diagonals are congruent ($\overline{AC} \cong \overline{BD}$)



Square

- A square is a quadrilateral with four right angles & four congruent sides

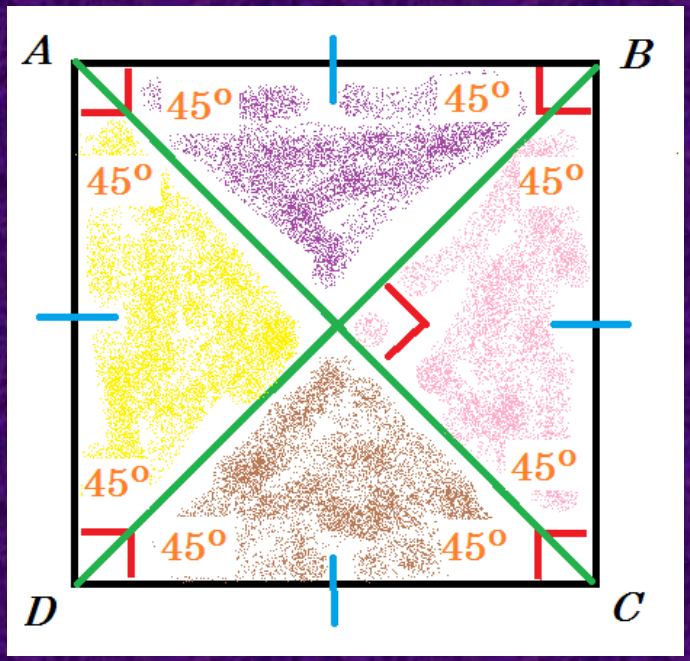
- All squares are rhombuses, so diagonals create four congruent triangles



Square

- A square is a quadrilateral with four right angles & four congruent sides

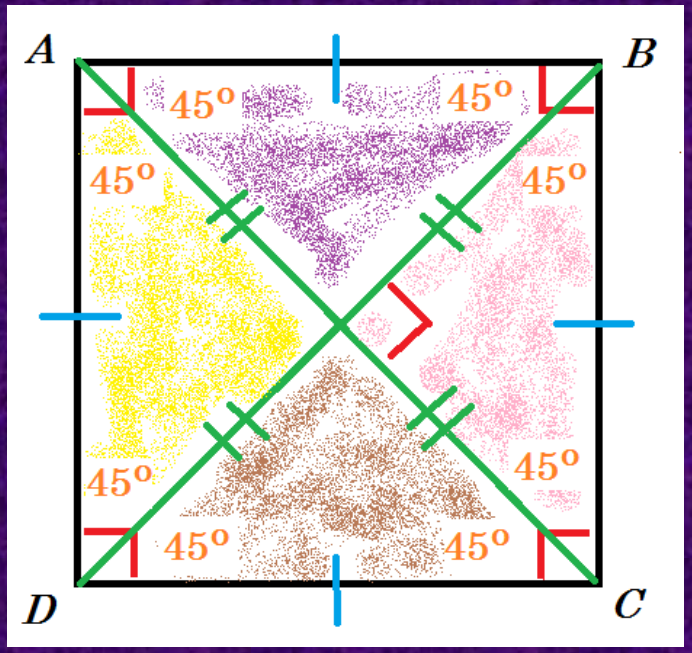
- All squares are rhombuses, so each diagonal bisects two opposite angles



Square

- A square is a quadrilateral with four right angles & four congruent sides

- Diagonals create four congruent 45°-45°-90° triangles



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