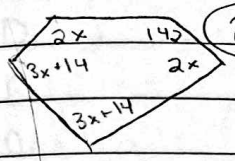
Unit 6.1:

Sum Interior ∠'s of a polygon:

$S_I = (n-2)180$

Ex) 

$2x + 142 + 3x + 14 + 3x + 14 + 2x = 540$

$10x + 170 = 540$

$-170, -170$

$10x = 370$

$x = 37$

Sum Exterior ∠'s of a Polygon:

$S_E = 360$

Regular: All sides + ∠'s are congruent

Ex) The measure of an interior ∠ in a regular polygon is 135°. How many sides?

8 sides

$135n = (n-2)180$

$135n = 180n - 360$

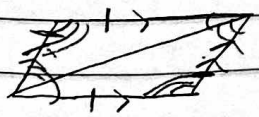
$\frac{-45n}{-45} = \frac{-360}{-45}$

$n = 8$

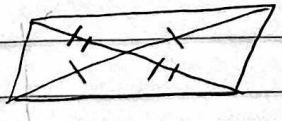
6.2: Parallelograms

Parallelogram: Quadrilateral with both sets of opposite sides ∥.

"  "

Ex) 

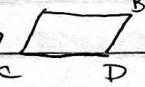
∠'s = 360



Properties of "  ":

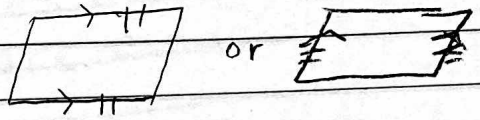
- Opposite sides ≅
- Opposite ∠'s ≅
- Diagonals bisect eachother
- Consecutive ∠'s supp
- If there is one is RT ∠'s then they're all RT ∠'s

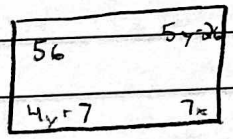
∠A, ∠B
∠A, ∠C



6.3: Determining a Parallelogram

- A quadrillateral is a ▱ if:
  - Both pairs of opposite sides are ≅ (Use dist. Form)
  - Both pairs of opposite ∠'s are ≅
  - Diagonals bisect eachother (Is there a midpt.)
  - Both pairs of opposite sides ∥.
- ★ - One pair of opposite sides are Both ∥ and ≅.

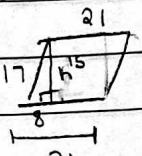


Ex) 

Check for parallelogram

11.1: Area of Parallelograms / Δ's

- Area of Parallelogram: bh (base × height)
- Area of Δ: $\frac{1}{2}bh$

Ex) 

$A_{\square} = 21(15)$

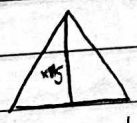
$= 315$ ★

$8^2 + h^2 = 17^2$

$64 + h^2 = 289$

$\sqrt{h^2} = \sqrt{225}$

$h = 15$

Ex) 

$A = 52$

$A = \frac{1}{2}bh$

$+2 \cdot 52 = \frac{1}{2}(x)(x+5) \cdot 2$ ★

$104 = x(x+5)$

Quadratic Formula

$104 = x^2 + 5x$

$-104 \quad -104$

$0 = x^2 + 5x - 104$

SEC. 6.4 - RECTANGLES

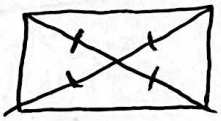
Rectangle: a Parallelgram with 4 RT ∠'s.

- Since a Rectangle is a "▱" it has All the Properties of a Parallelogram.
- What makes a rectangle more specific than Just a Parallelel gram is it has 4 RT ∠'s.

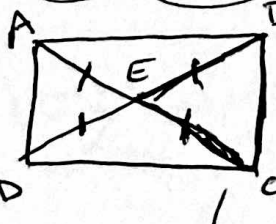
Properties of a RECTANGLE:

1) All Properties of a Parallelogram

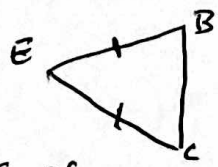
** 2) Diagonals are ≅

Ex)  ⟹ This Picture Tells us the Diagonals bisect eachother and that they are ≅, therefore This is a Rectangle.

*** If the Diagonals of a Parallelogram are ≅ then it is a Rectangle.

Ex) 

⟹ Analyze this Picture more. We Know its a Paralellogram because diagnls bisect each other. We then Know its a Rectangle because the Diagnls are ≅. If we look closer we also have 4 Isosceles Δ's. We know alot of Info about Isoscles Δ's. If I Pull one of the Δ's out WE GET



Now ∠B ≅ ∠C

- ∠DAB = RT∠
- ∠CBA = RT∠
- ∠BCD = RT∠
- ∠CDA = RT∠
- AB ∥ DC • opposite ∠s ≅
- AD ∥ BC • consecutive ∠s Supp
- AD ≅ BC
- AB ≅ DC

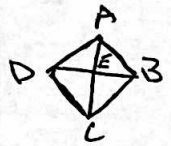
* We can apply all properties of Parallelograms/Rectangles To this Picture To solve for many missing Parts

Sec 6.5 - Rhombus / Square.

- **Rhombus**: a Parallelogram with 4 $\cong$ sides

Properties of Rhombus:

1) all Properties of a Parallelogram
2) Diagonals are $\perp$
3) Diagonals bisect Each Pair of opposite $\angle$'s.

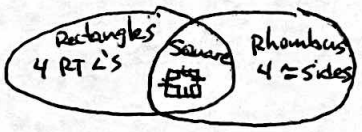
Ex) 

If ABCD is a Rhombus:
- opposite sides $\cong$ (all $\cong$) - by Definition
- opposite $\angle$'s $\cong$
- $AE \cong EC$ } Diagonals bisect
- $DE \cong EB$ }
- $AC \perp DB$ = RT $\angle$'s formed = 4 RT $\triangle$ on Interior.
- $\angle DAE \cong \angle BAE$, $\angle DCE \cong \angle BCE$, $\angle ADE \cong \angle CDE$, $\angle ABE \cong \angle CBE$

- If Diagonals are $\perp$, then its a Rhombus
- If Diagonals bisect opposite $\angle$'s, then its a Rhombus

- **Square**: a Parallelogram with 4 $\cong$ sides and 4 RT angles.

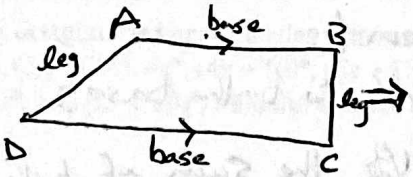
A Square is a Rectangle/Rhombus combined.



- Has all Properties of Parallelograms Rectangles/Rhombus.

Sec 6.6 - Trapezoids / Kites.

Trapezoid = a Quadrilateral with exactly one Pair of Parallel sides.

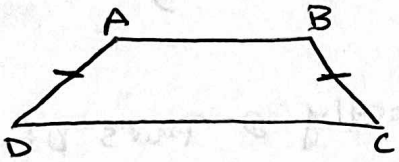


Trapezoid ABCD

$\angle A \& \angle B$
$\angle D \& \angle C$ → Base angles.

$AB \parallel CD$

Isosceles Trapezoid: when the legs are $\cong$



ABCD is an Isosceles Trapezoid

If a Trapezoid is Isosceles:

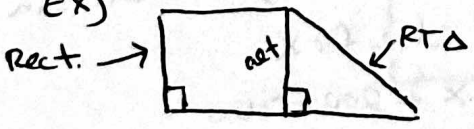
1) legs are $\cong$ - $AD \cong BC$
2) Each Pair of base $\angle$'s are $\cong$ $\angle A \cong \angle B$, $\angle D \cong \angle C$
3) Diagonals are $\cong$. $DB \cong AC$

* Remember a Trapezoid has the Bases Parallel so what Do you Know about Consecutive $\angle$'s? i.e $\angle A \& \angle D$, $\angle B \& \angle C$

* A TRAPEZOID is Isosceles if its Diagnols are $\cong$

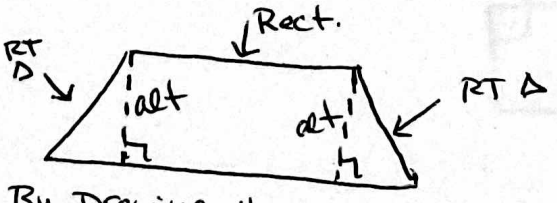
- When you have a Trapezoid, you can Draw the altitudes which would give you RT Δ's.

Ex)



By Drawing the altitude we have a Rectangle and a RT Δ, but Together a Trapezoid.

Ex)

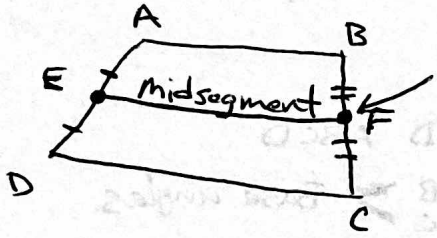


By Drawing these altitudes we get 2 RT Δ's (careful they don't have to be the same) and a Rectangle.

OVER

Midsegment of a TRAPEZOID: segment formed by the midpts of the legs.

Ex)



midsegment:

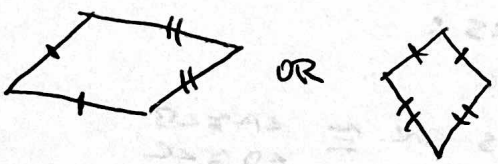
1) is // To both bases
2) is $\frac{1}{2}$ the sum of both bases.

1) • $EF \parallel AB$ • $EF \parallel DC$ } If lines are // then???

2) $EF = \frac{1}{2}(\overline{AB} + \overline{DC})$

KITE: a Quadrilateral with Exactly 2 Pairs of Consecutive sides $\cong$.

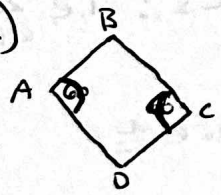
Ex)



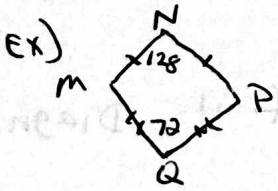
If a Quadrilateral is a Kite then

1) Diagonals are $\perp$
2) one Pair of opposite $\angle$'s $\cong$.

Ex)



Ex)



Find $\angle m$.

- Since $\angle N \ncong \angle Q$ and since it is a Kite $\angle m \cong \angle P$. So call $\angle m = X$, which means $\angle P = X$ so....

$-128 + X + 72 + X = 360$

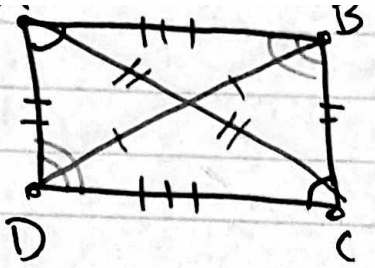
$(\angle N + \angle P + \angle Q + m) = (\text{sum int } \angle\text{s in Quad})$

Now solve for X.

$2X + 200 = 360$

$2X = 160$

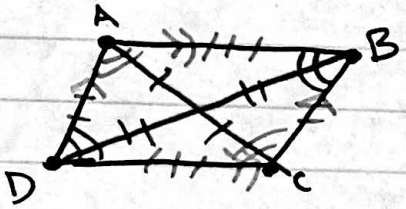
$X = 80$ so $\boxed{\angle m = 80^\circ}$



- Opposite sides ≅
- Opposite ∠'s ≅
- ∠'s bisect eachother
- $\angle B + \angle C = 180°$ $\angle A + \angle D = 180°$

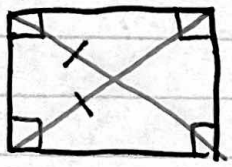
* If one ∠ is a RT ∠ then ALL are RT ∠'s*

Properties of a Parallelogram:



- Both pairs of opposite sides ≅
- Both pairs of opposite ∠'s ≅
- Diagonals bisect eachother
- Both pairs of sides are //
- One pair of opposite sides are BOTH // and ≅

Properties of Rectangle:

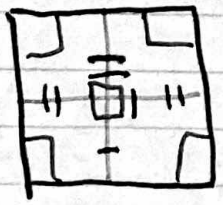


- All properties of a Parallelogram
- Diagonals are ≅

Properties of a Rhombus:

- All properties of a parallelogram
- Diagonals are ⊥
- Diagonals bisect opposite ∠'s

Properties of a ~~Parallelogram~~ Square:



- All properties of a Rectangle + Rhombus