

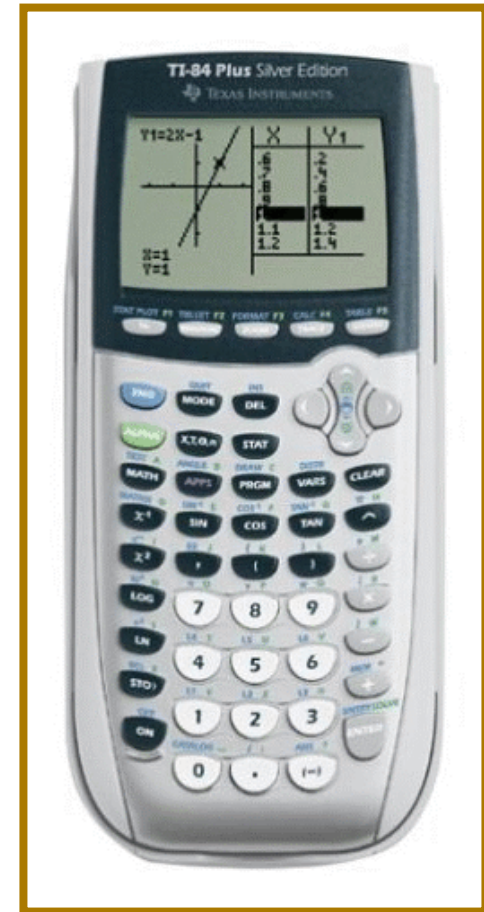
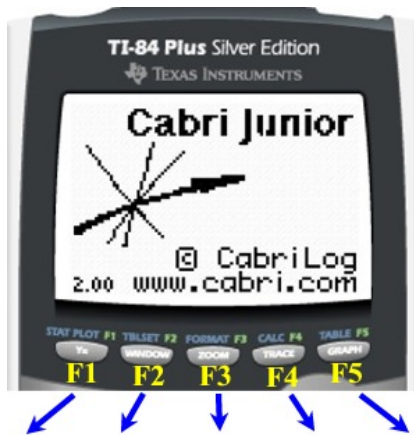
## 5.5 Parallelograms

# About Cabri JR

Press APPS

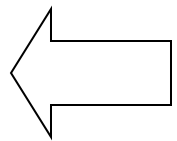
APPS

- Chose Cabri JR
- Press any button to continue




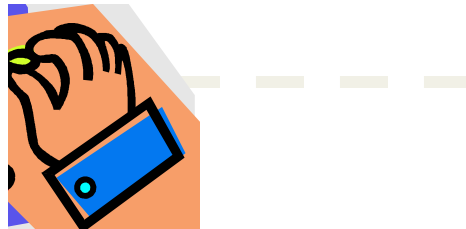
# Tips for Cabri Jr

Menus are on F<sub>1</sub>, F<sub>2</sub>, F<sub>3</sub>, F<sub>4</sub>, and F<sub>5</sub>




You must have the arrow to drag.

Press  when you are pointing to what you want to drag to get a hand.

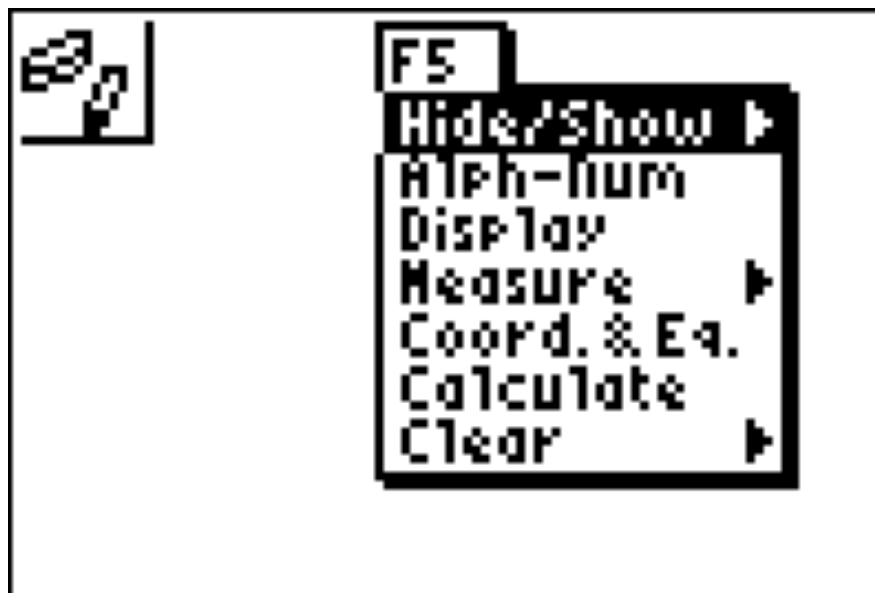


F1  
Animate  
Undo ▶  
Help ▶  
New  
Open...  
Save  
Save as...  
Quit

F2  
Point ▶  
Line  
Segment  
Circle  
Triangle  
Quad.

 F3  
Perp.  
Parallel  
Perp. Bis.  
Angle Bis.  
Midpoint  
Compass  
Locus

 F4  
Symmetry  
Reflection  
Translation  
Rotation  
Dilation

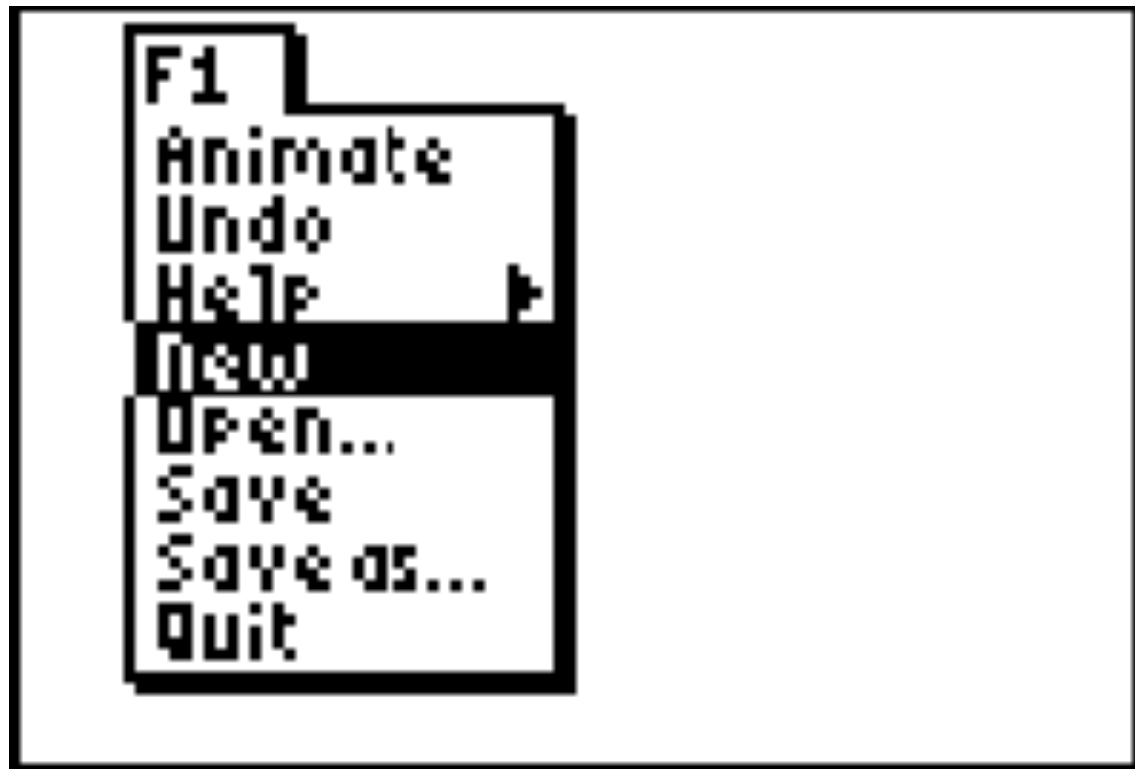


- Press **CLEAR** anytime to exit of the Function Menu F1 – F5
- If you want to **HIDE/ ERASE** something you have done F5/ Hide-Show/ Object

# Parallelogram Investigation

## Draw a parallelogram

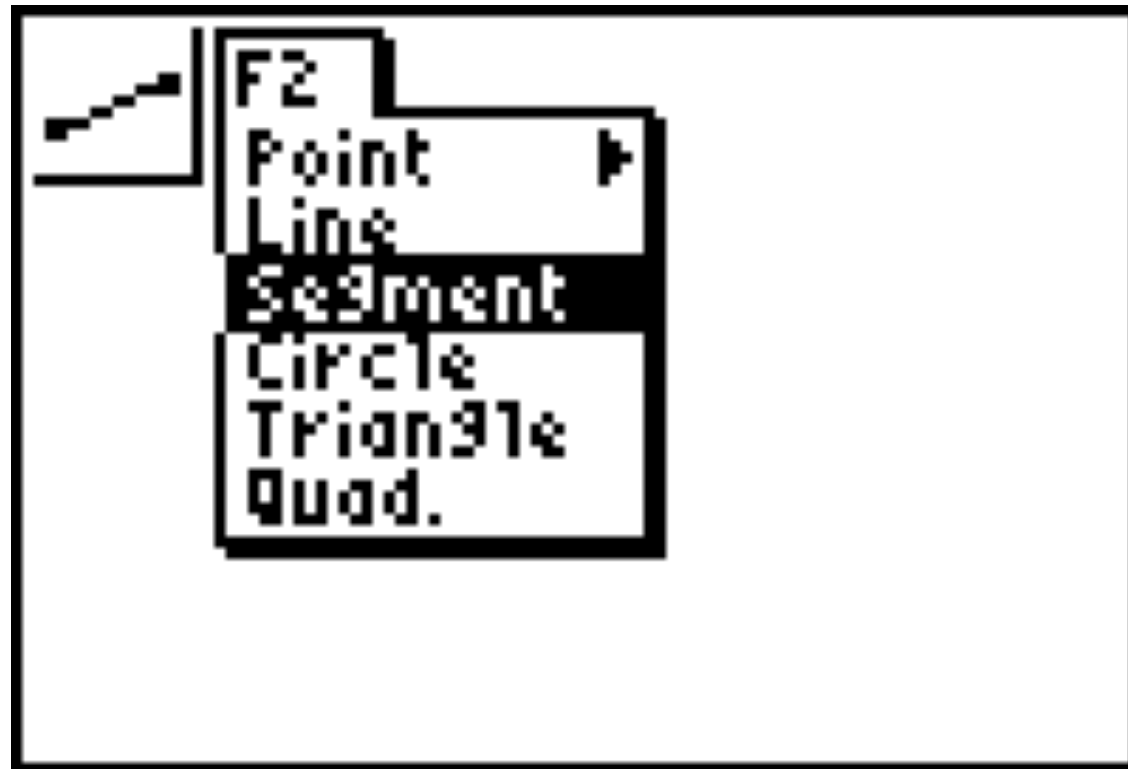
- In the F1 menu highlight **New** and press Enter



# Parallelogram Investigation

## Draw a parallelogram

- Open the F2 window, scroll to **Segment** and press ENTER.



# Parallelogram Investigation

## Draw a parallelogram

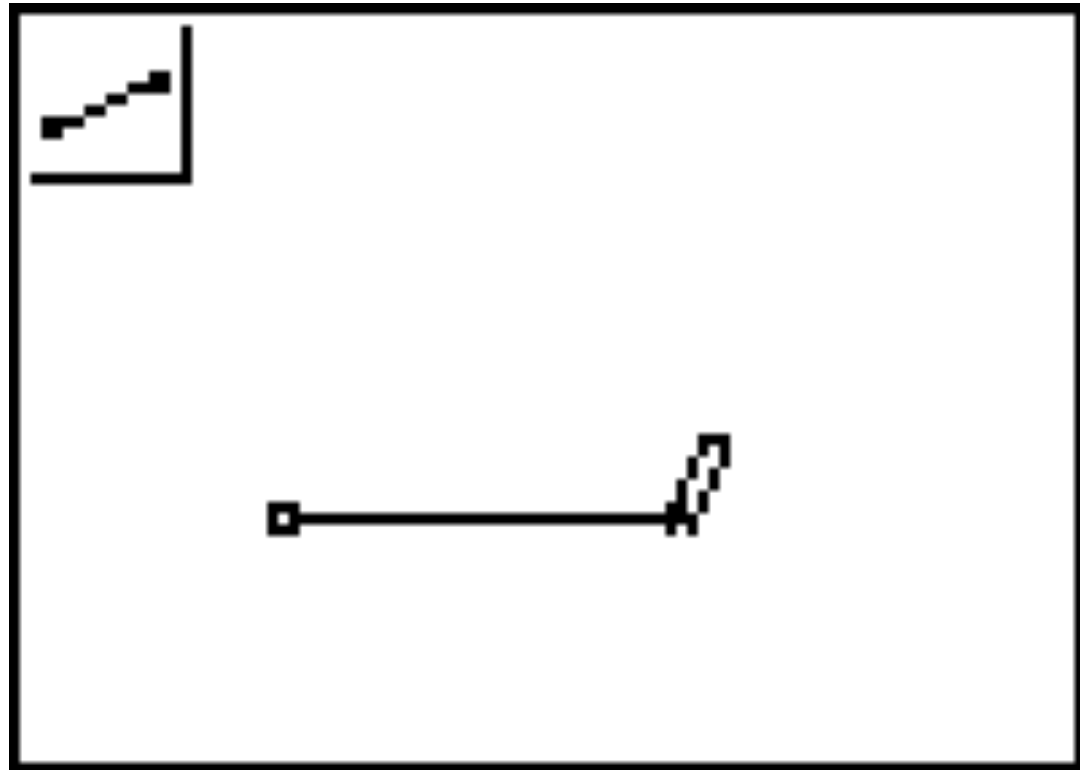
- Find the starting position (point) for your segment

- Press Enter

- With the arrows

Draw a line segment.

- Press Enter again

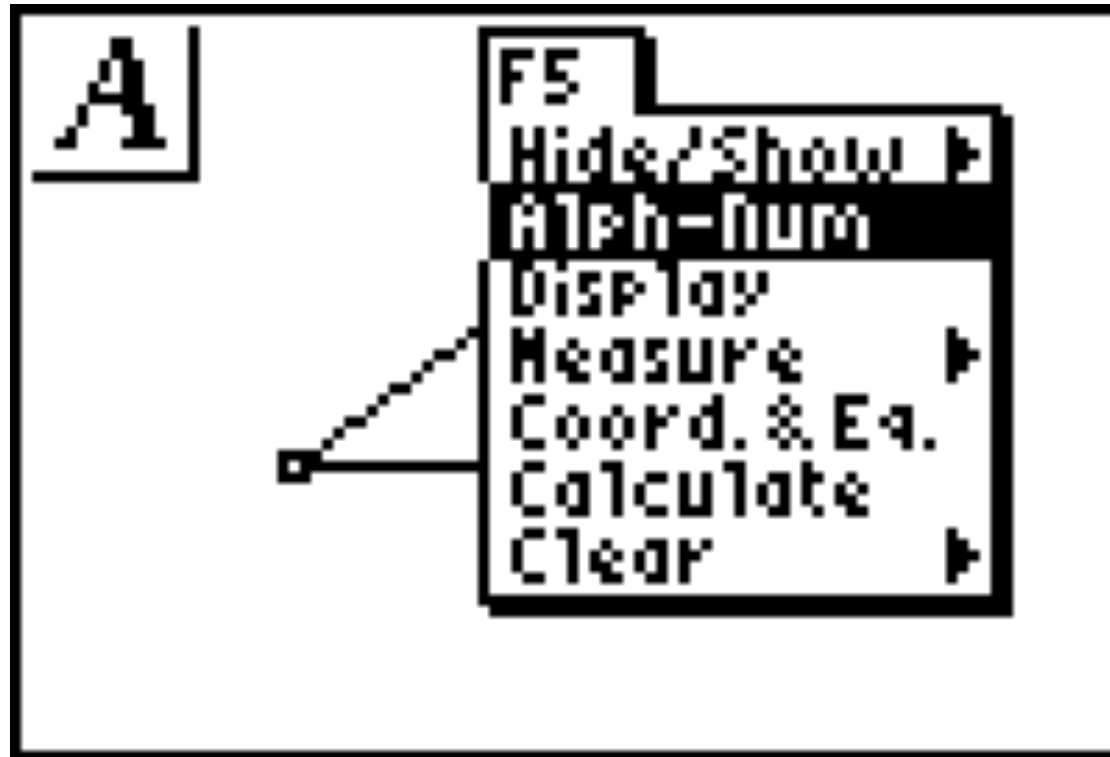




# Parallelogram Investigation

## Draw a parallelogram

- Highlight **Alp-Num** in the F5 menu.

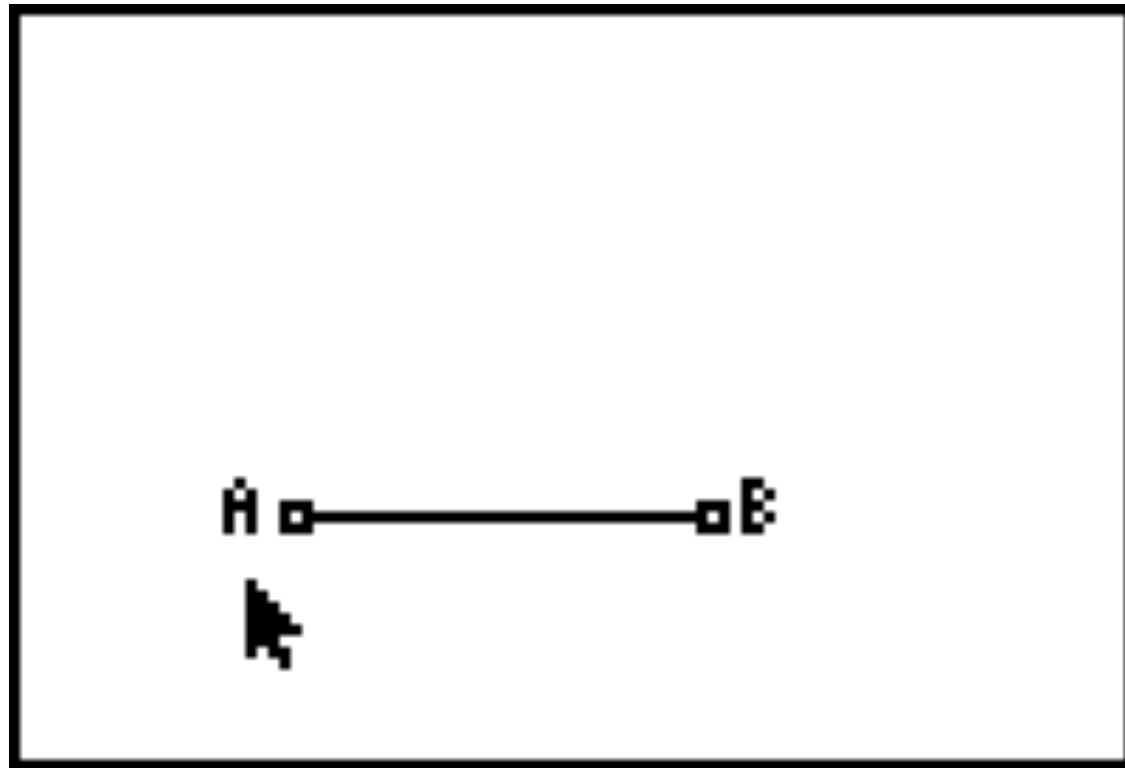


# Parallelogram Investigation

**Draw a parallelogram**

- Label the segment .  $\overline{AB}$

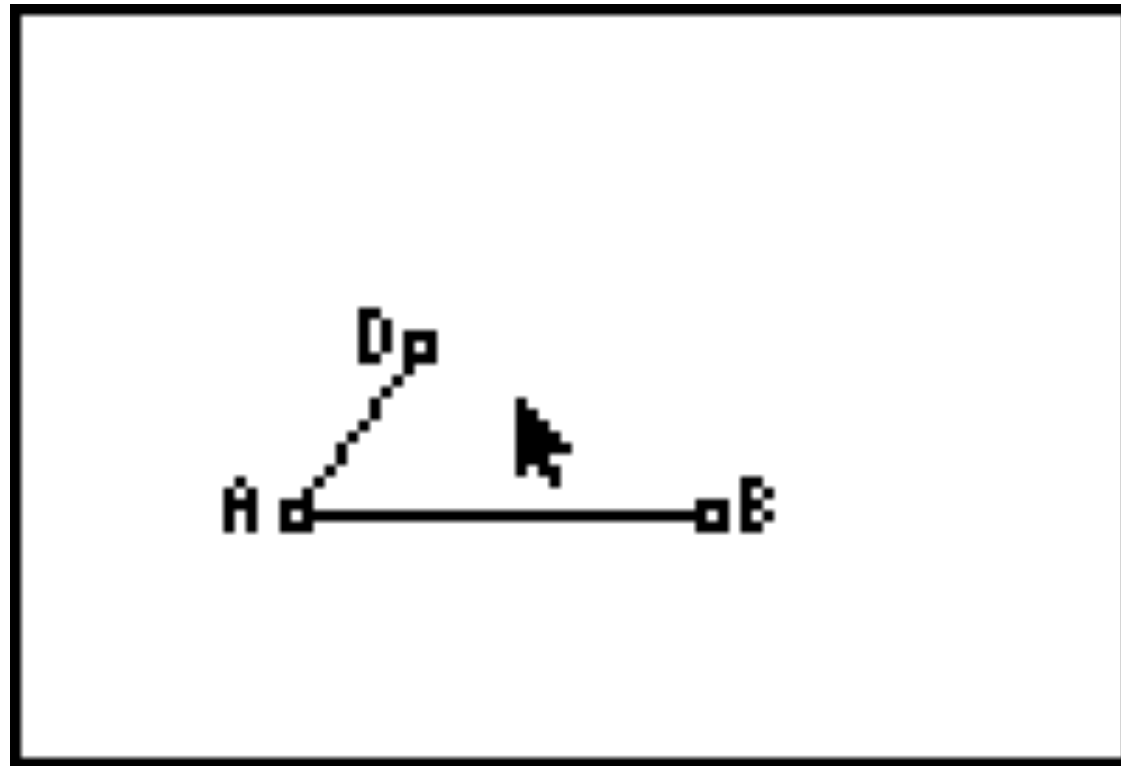
*Get to the position where letter should be placed press enter, type the letter/ press Enter again...*



# Parallelogram Investigation

Draw a parallelogram

- Draw line segment  $\overline{AD}$ .

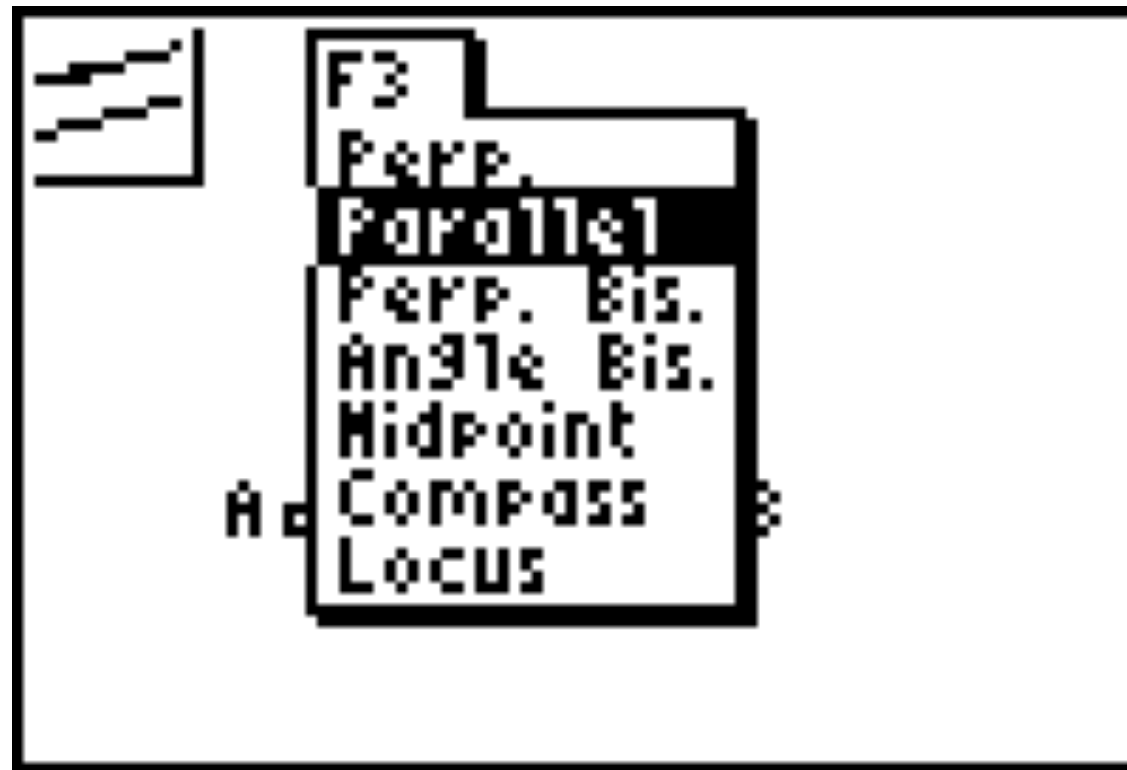


# Parallelogram Investigation

## Draw a parallelogram

- In F3 select **Parallel**.

- 

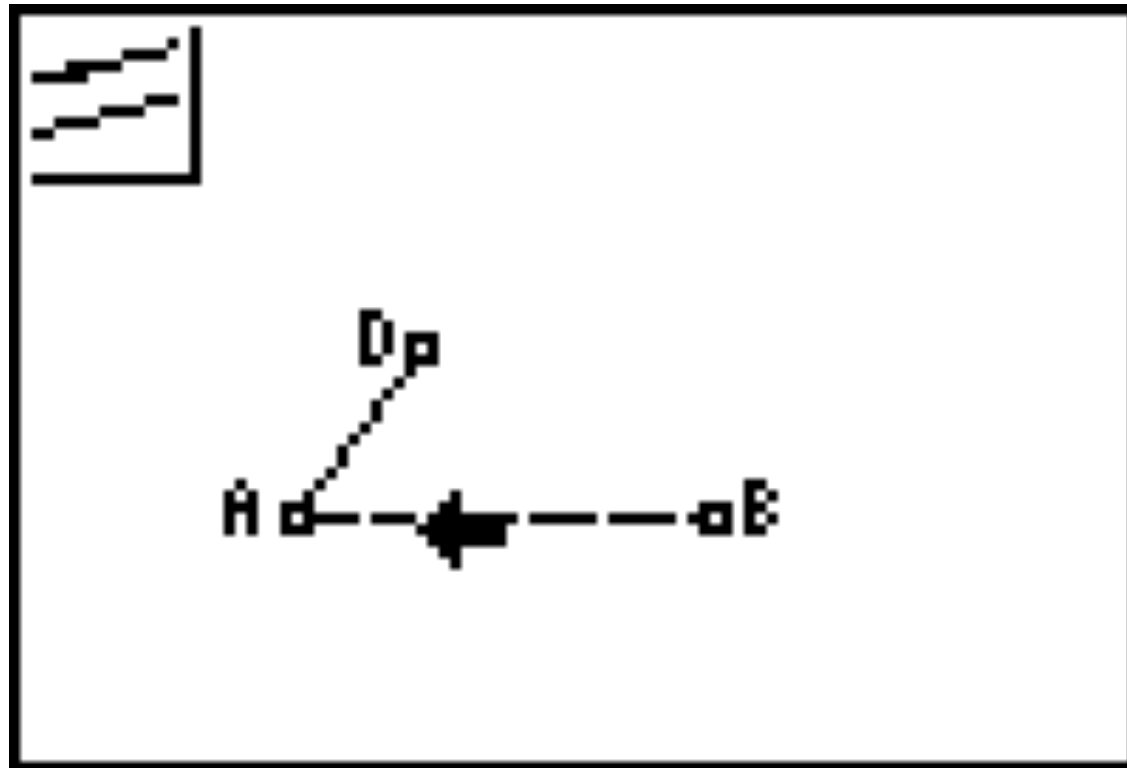


# Parallelogram Investigation

## Draw a parallelogram

- Highlight  $\overline{AB}$  and press ENTER.

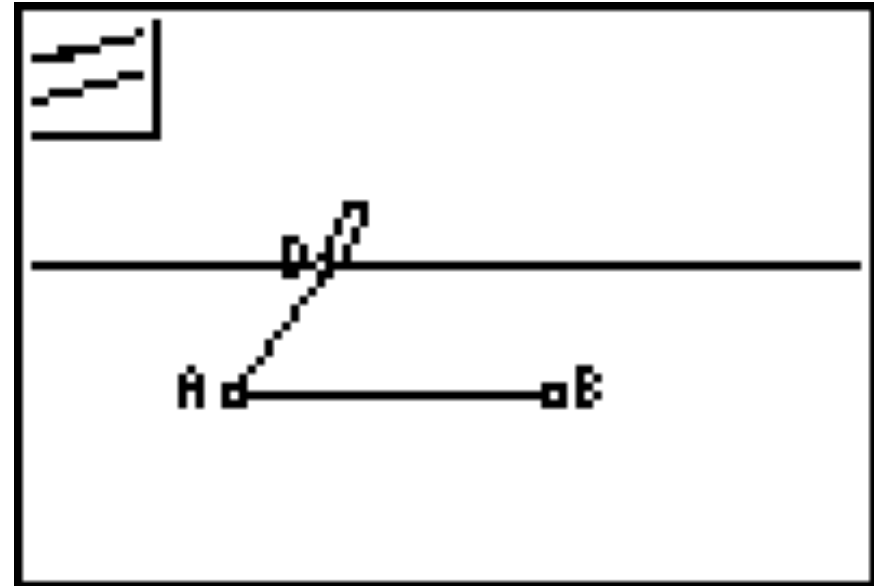
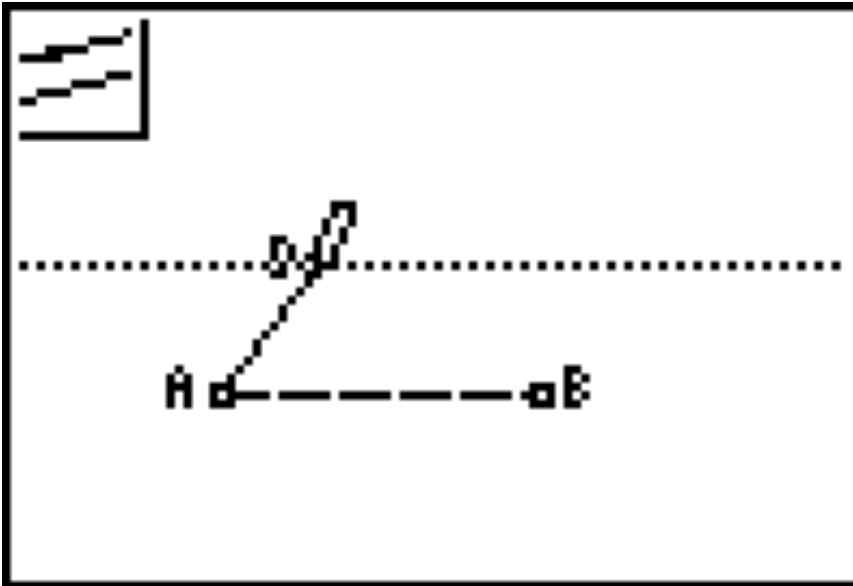
- 



# Parallelogram Investigation

## Draw a parallelogram

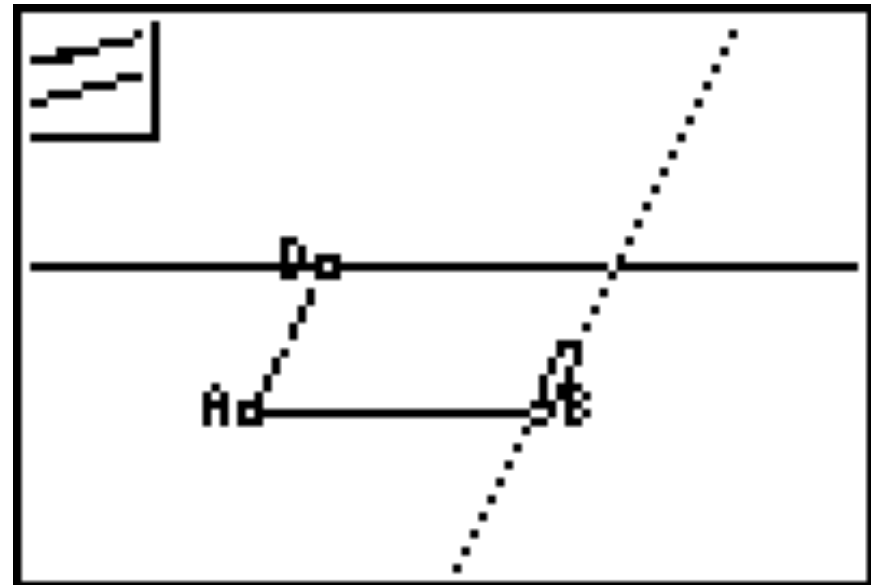
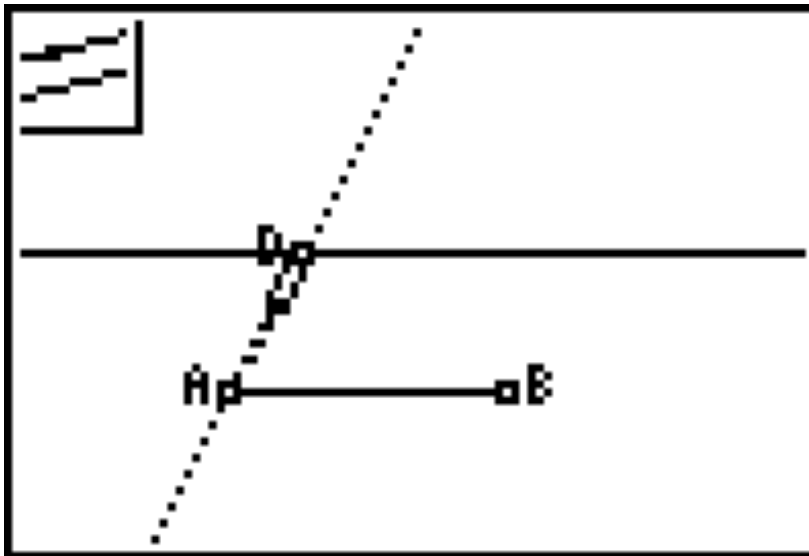
- With the arrow keys move the parallel line up to point D so that D is blinking and press ENTER.



# Parallelogram Investigation

## Draw a parallelogram

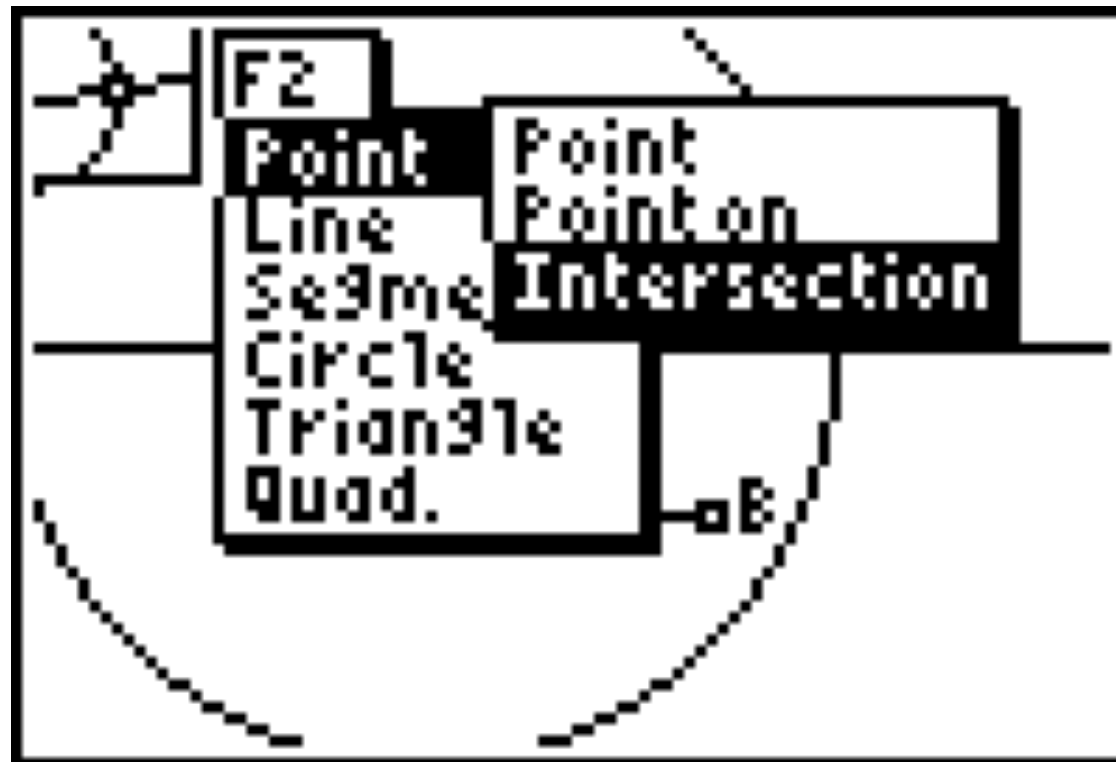
- Construct a line parallel to  $\overline{AD}$ .



# Parallelogram Investigation

## Draw a parallelogram

- There are three choices under the **Point** tool.
- Select **Intersection**.

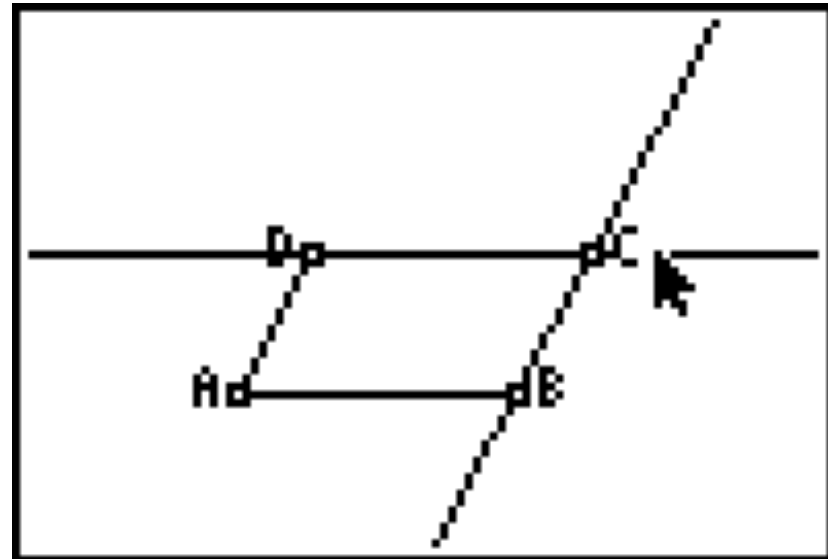
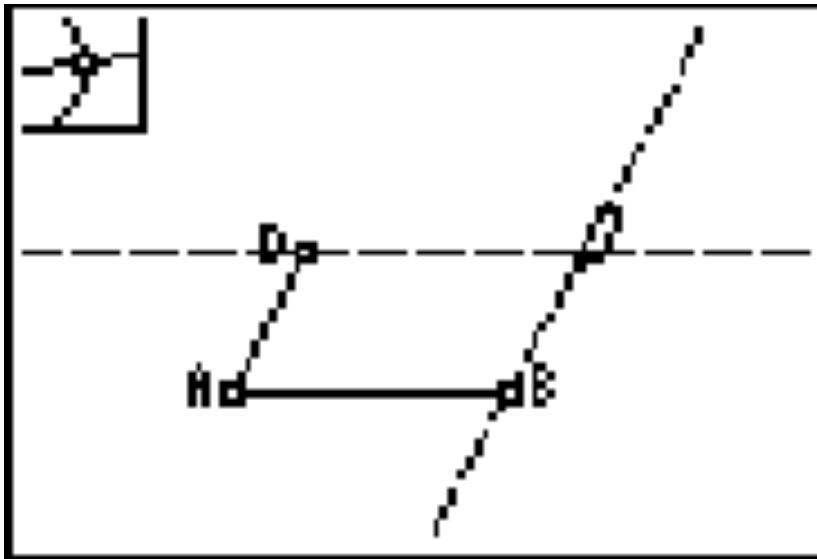




# Parallelogram Investigation

## Draw a parallelogram

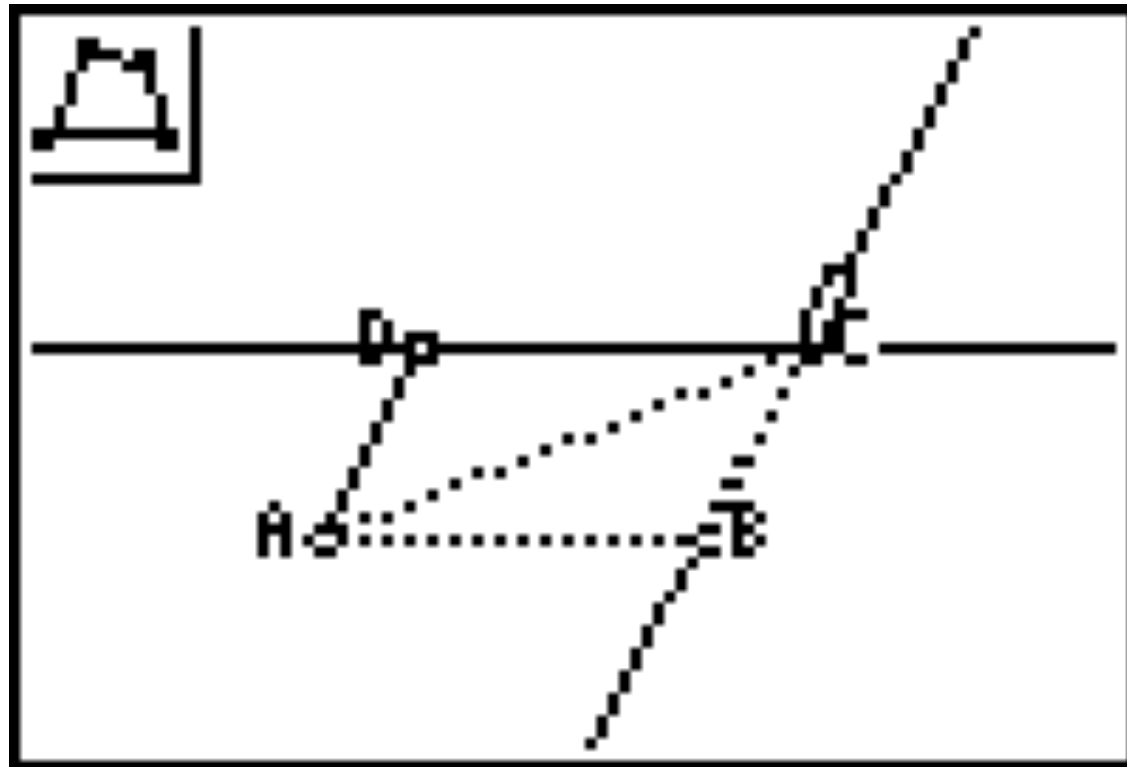
- Move the cursor until both lines are blinking.
- Press ENTER.
- Label the point C.



# Parallelogram Investigation

## Draw a parallelogram

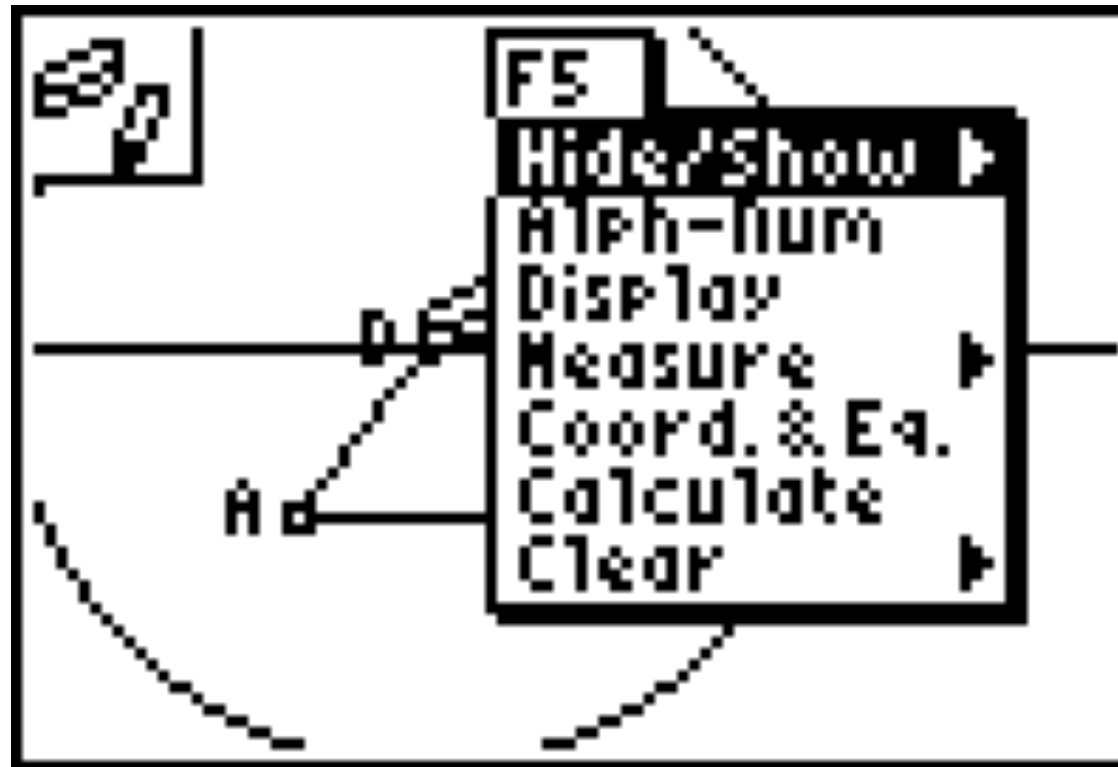
- Under F2 select the **Quad** tool.
- Select A, then B, C, and D.



# Parallelogram Investigation

## Draw a parallelogram

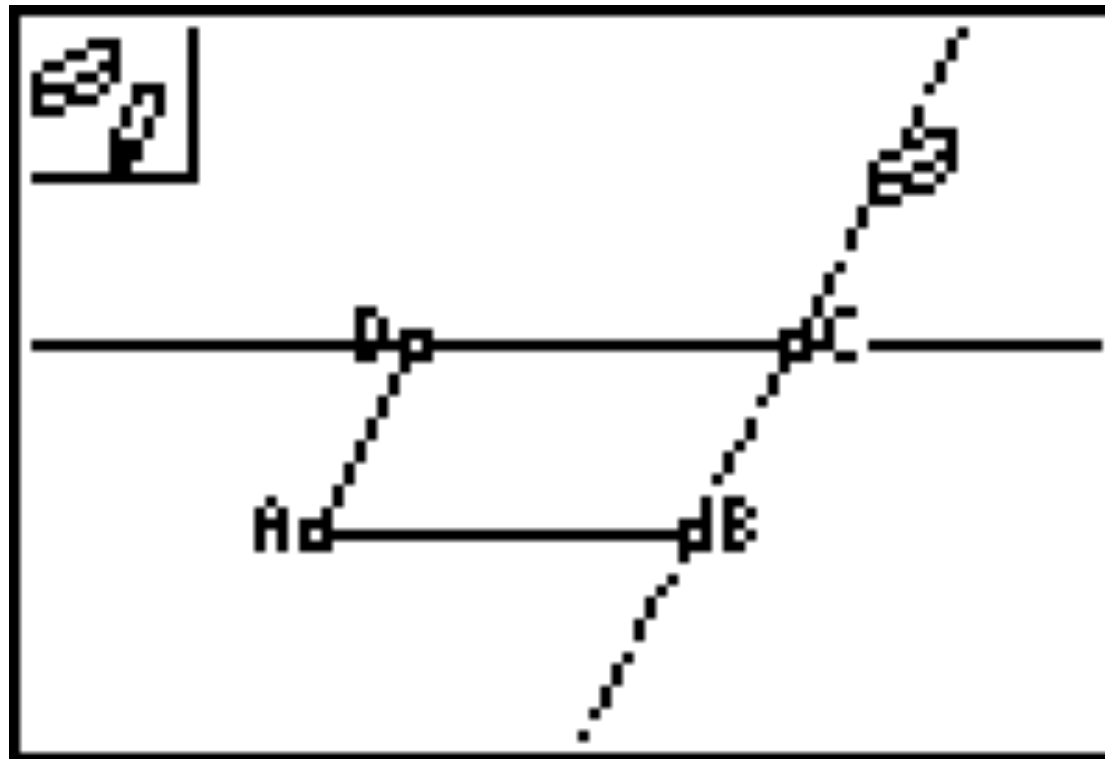
- Highlight the **Hide/Show** tool in F5 and press ENTER.



# Parallelogram Investigation

## Draw a parallelogram

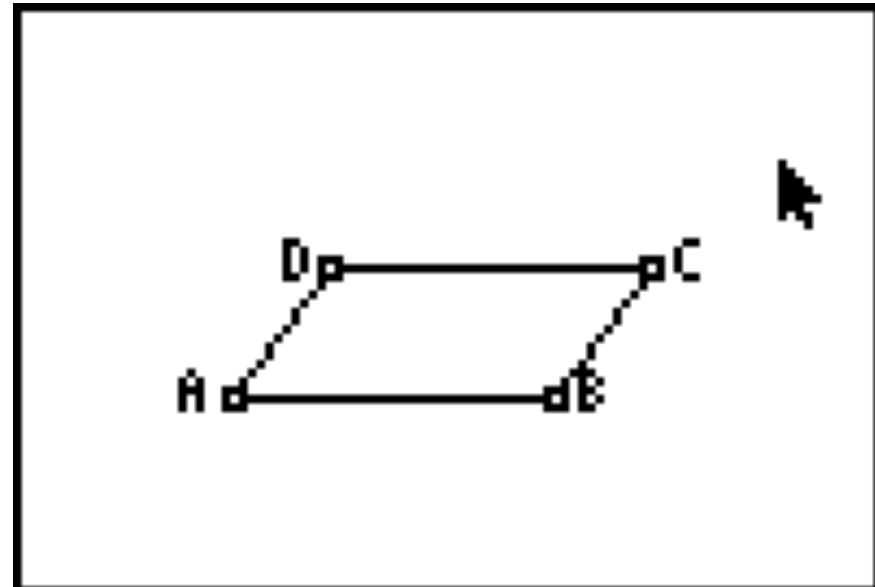
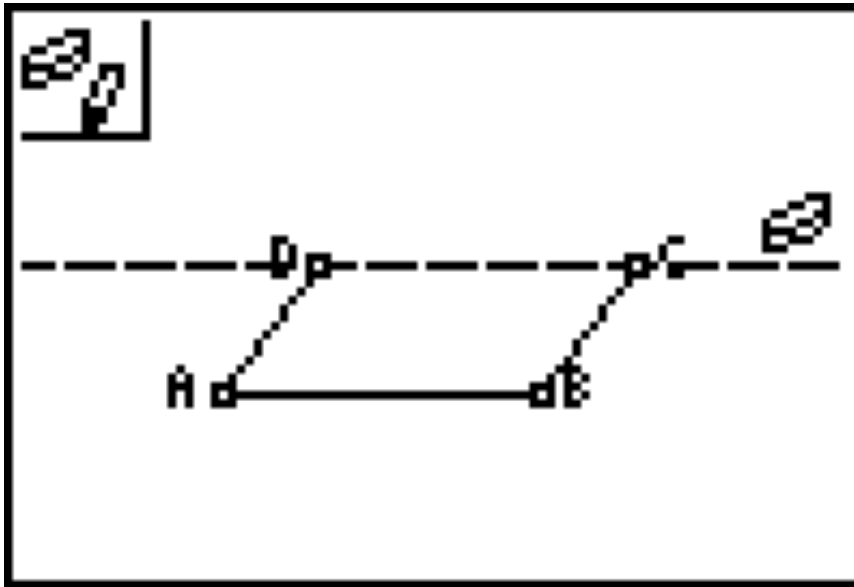
- Select  $\overline{BC}$  and press ENTER.



# Parallelogram Investigation

## Draw a parallelogram

- Hide  $\overline{DC}$  .



*A figure will not disappear until the cursor is moved away from it.*

# Parallelogram Investigation

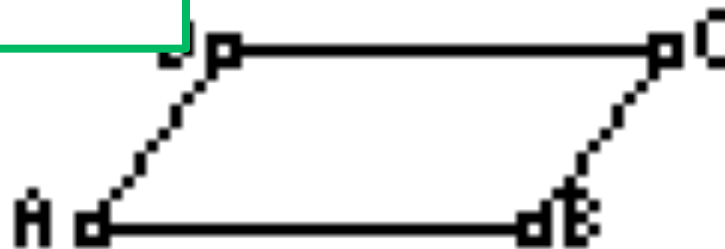
**Save Your Parallelogram F1/ save As/ Natasha**

- Grab pt. A and move it around. Does ABCD stay a parallelogram?
- Try grabbing points B, C, and D. What happens?
- Which point can you *not* grab?
- Why do you think this is so?

# Parallelogram Investigation

**Draw a parallelogram**

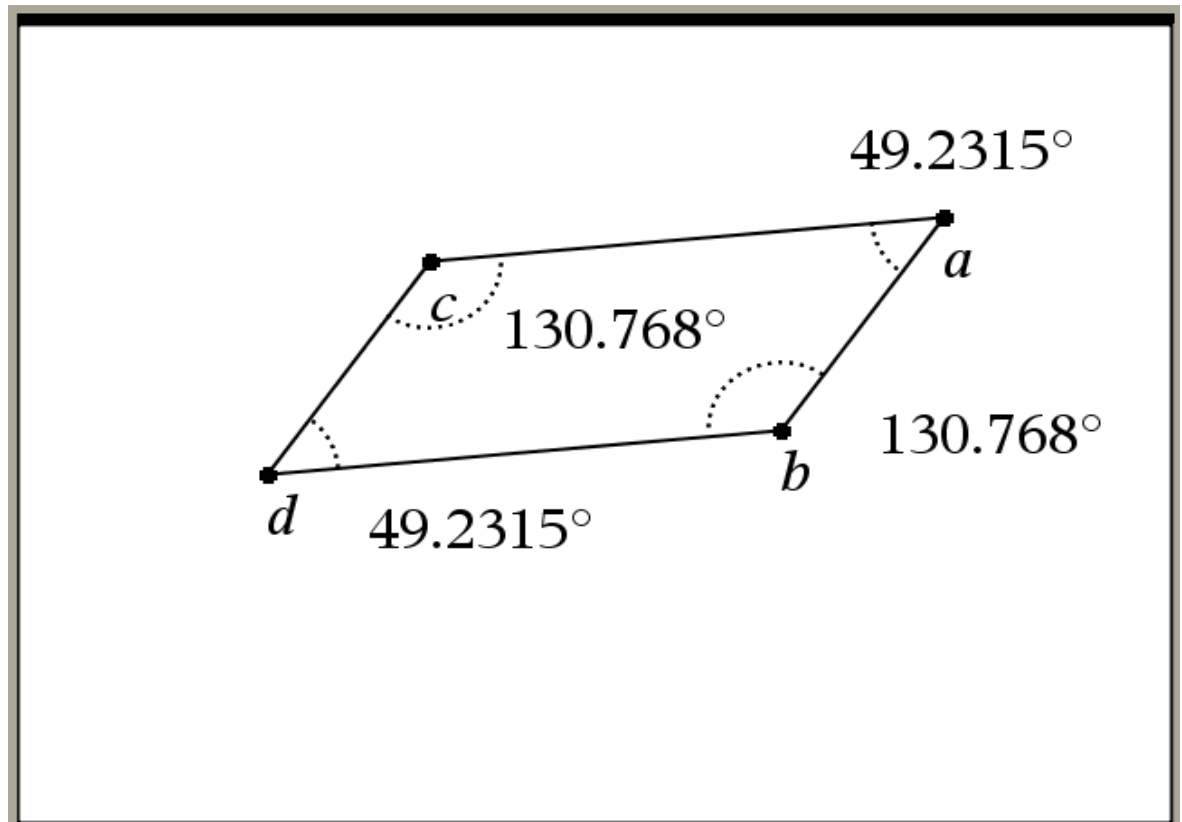
**Point C cannot be moved  
it is dependent**



# Parallelogram Investigation

Measure all four angles of the parallelogram

- Under F5 select the **Measure** tool.
- There are four choices under the **Measure** tool.
- Select **Angle**.

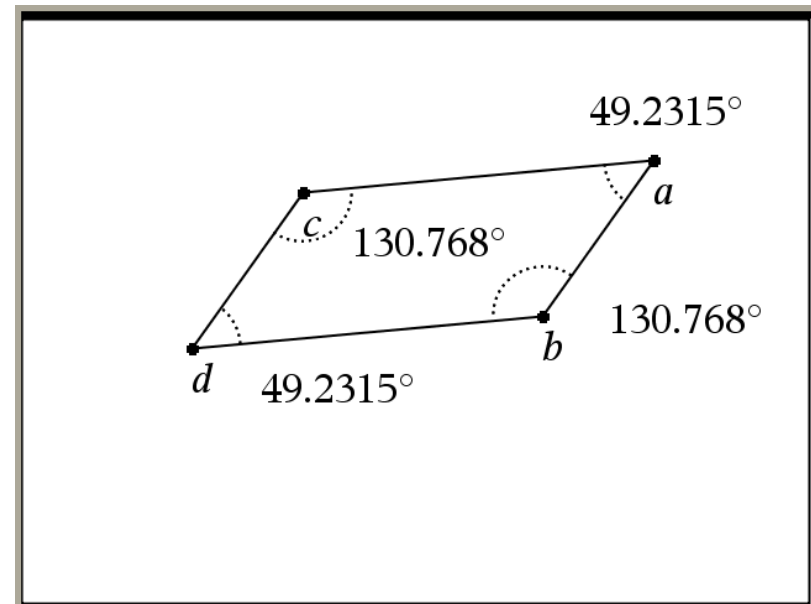
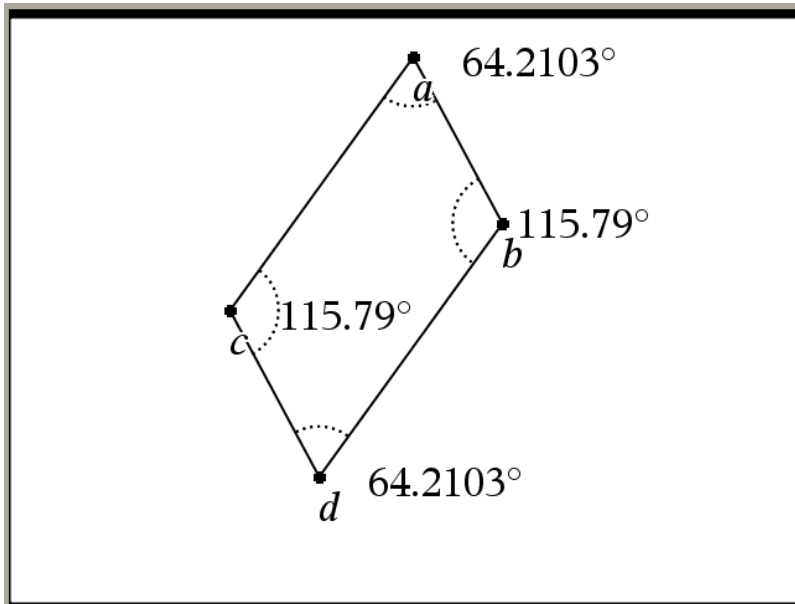




# Parallelogram Investigation

**Measure all four angles of the parallelogram**

- Grab and move the segment AB, look at the interior angles, what conclusion can we make?



# Parallelogram Opposite Angle Conjecture

- The opposite angles of a parallelogram are congruent.

# Parallelogram Consecutive Angle Conjecture

- Consecutive angles of a parallelogram are supplementary

# Parallelogram Investigation

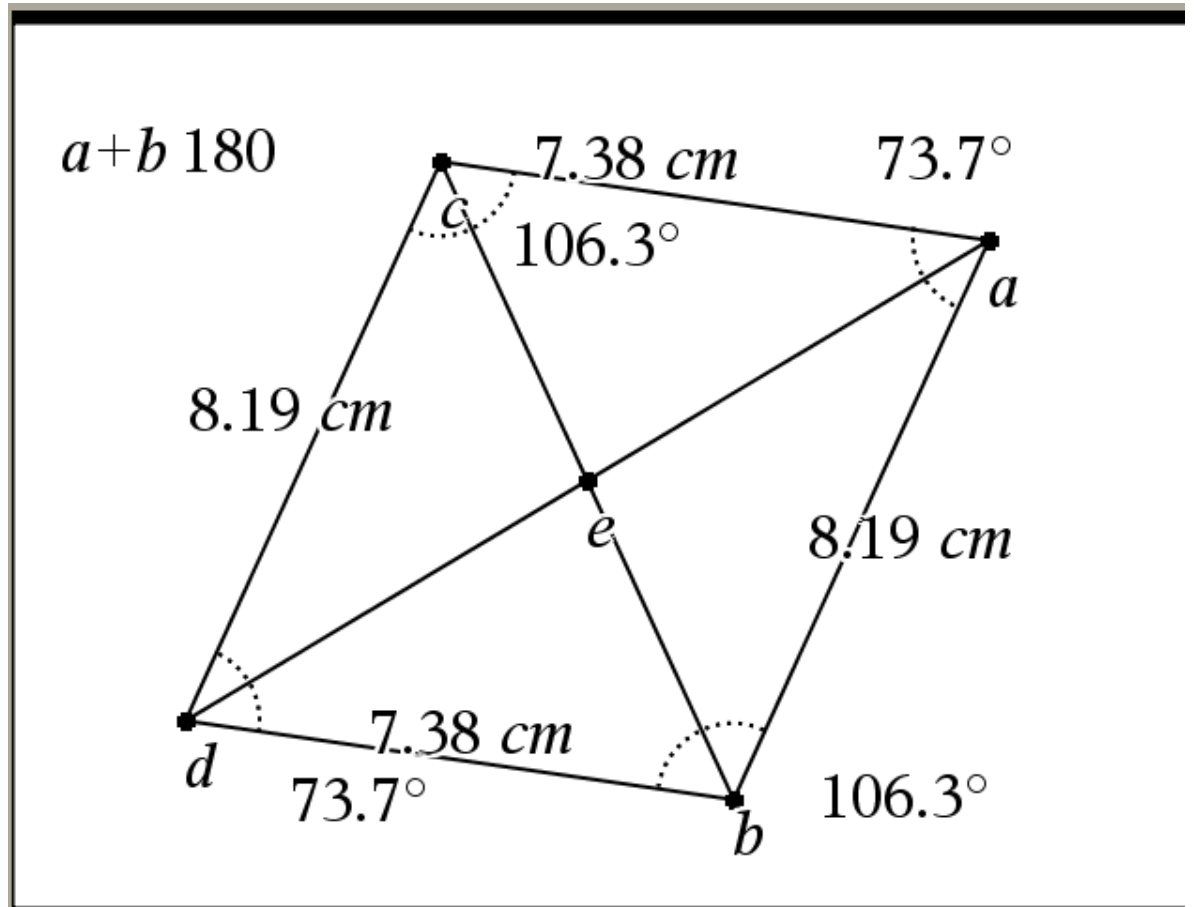
- Under the **Measure** tool, choose D. & Length
- Measure the length of all four sides (select the points on each segment and press Enter)
- Move the segment AB up/down, left/ right to change the shape and compare

# Parallelogram Opposite Side Conjecture

- The opposite sides of a parallelogram are congruent

# Parallelogram Investigation

- Add both diagonals to the drawing

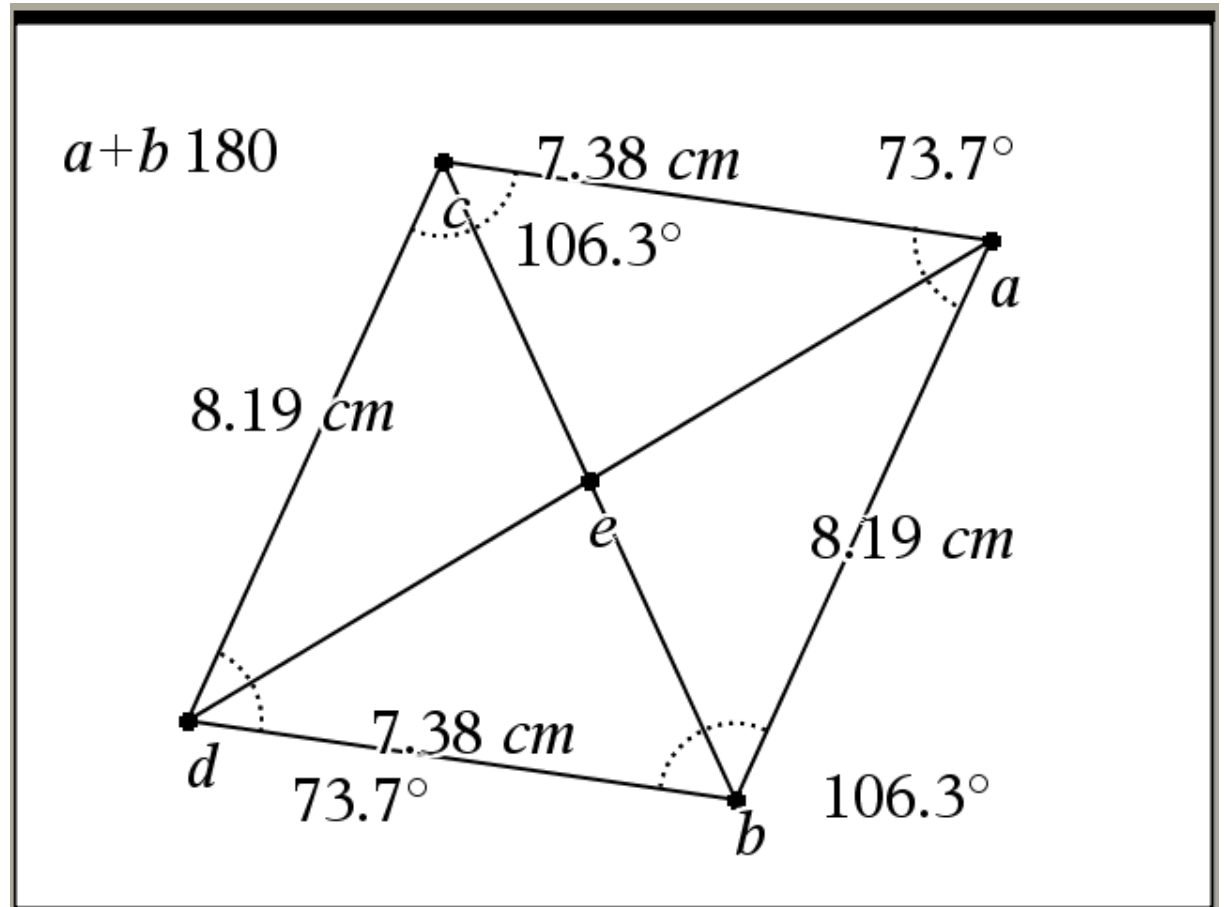


# Parallelogram Investigation

- Add a point at the intersection of the diagonals and label it “e”

Menu > 7 > 3

Select each line



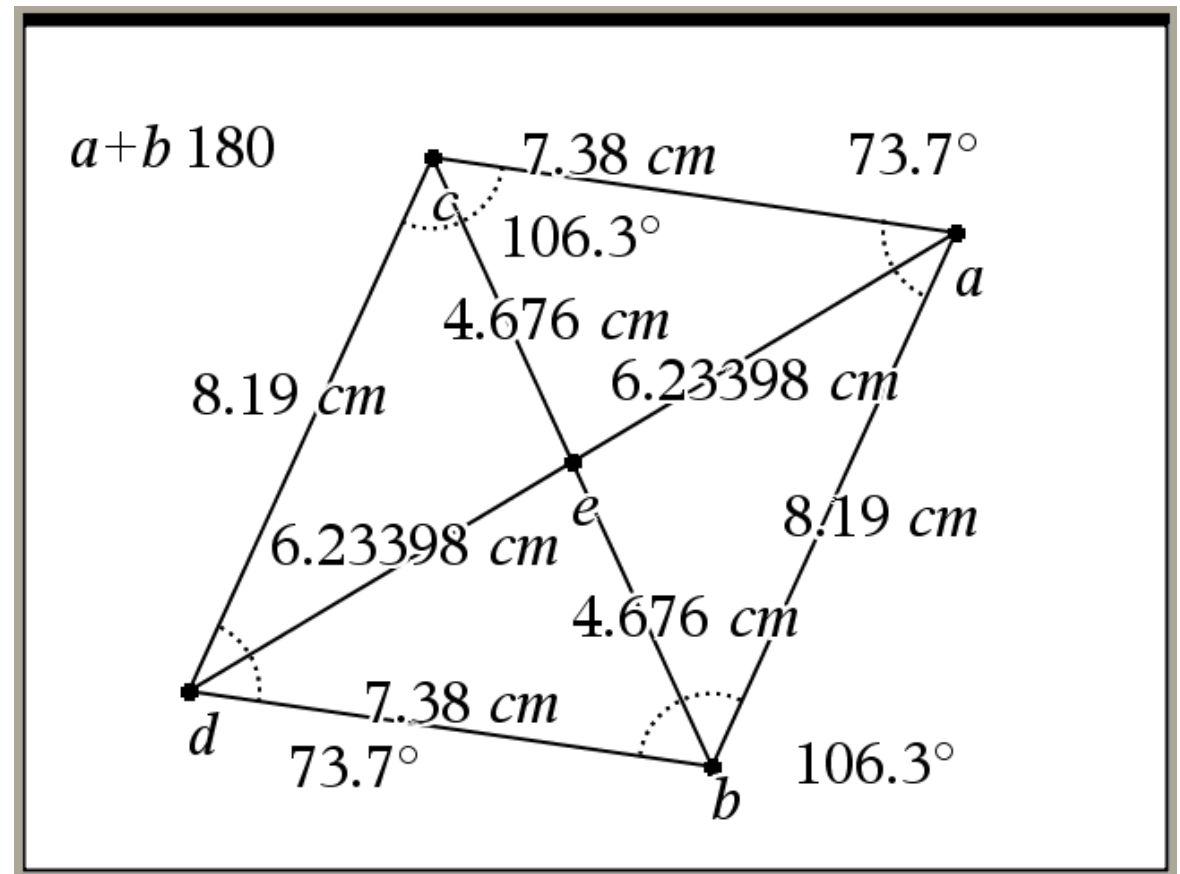
# Parallelogram Investigation

- Measure the lengths of AE, BE, CE & DE

Menu > 8 > 1

Shift figure

Conclusion?





# Parallelogram Diagonal Conjecture

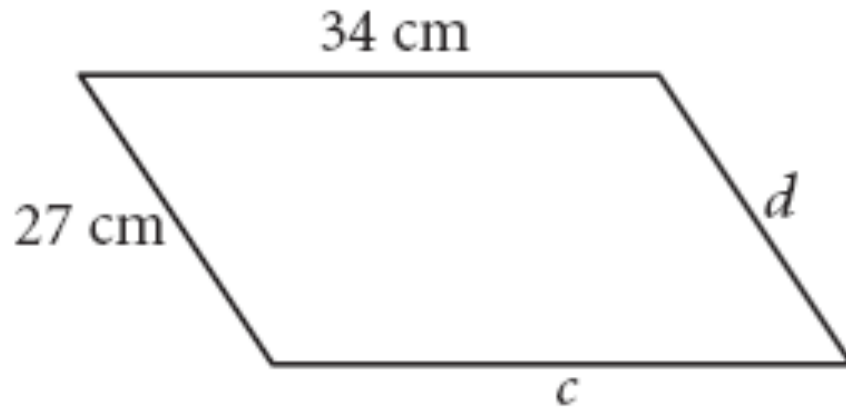
- Diagonals of a parallelogram are bisectors

# Practice Problems

# Practice Problems

$$c = \underline{\quad?}$$

$$d = \underline{\quad?}$$



$c = 34$  cm,  $d = 27$  cm. Use the Parallelogram Opposite Sides Conjecture.

# Practice Problems

$$a = \underline{\quad?}$$

$$b = \underline{\quad?}$$

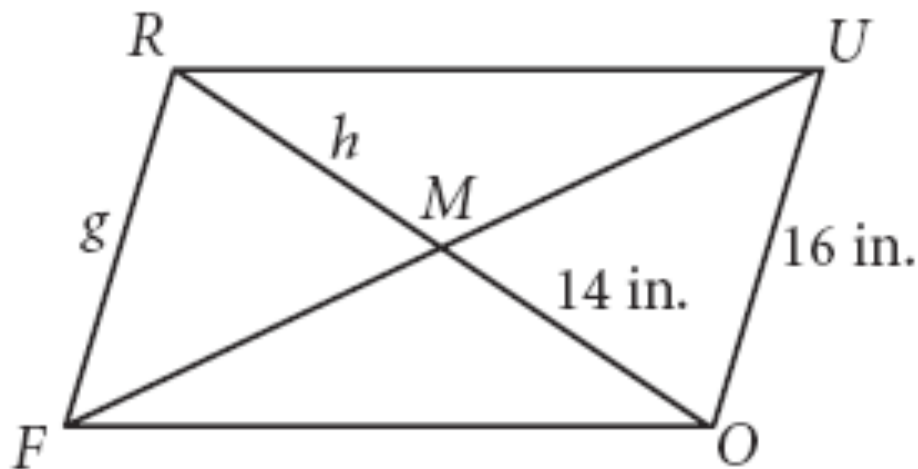


$a = 132^\circ$ ,  $b = 48^\circ$ . By the Parallelogram Consecutive Angles Conjecture,  $a = 180^\circ - 48^\circ = 132^\circ$ , and by the Parallelogram Opposite Angles Conjecture,  $b = 48^\circ$ .

# Practice Problems

$$g = \underline{\quad?}$$

$$h = \underline{\quad?}$$

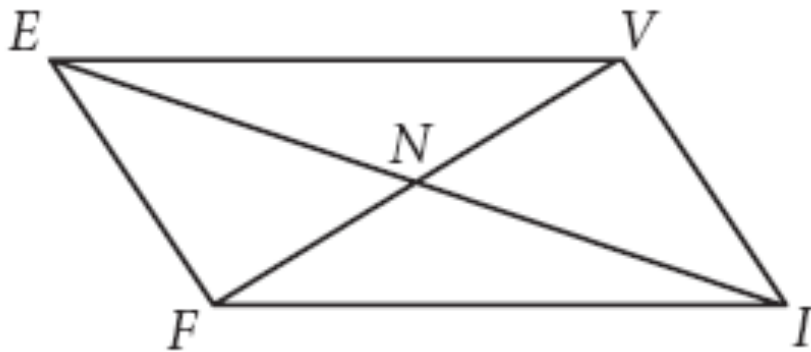


$g = 16 \text{ in.}$ ,  $h = 14 \text{ in.}$  Use the Parallelogram Opposite Sides Conjecture to find  $g$  and the Parallelogram Diagonals Conjecture to find  $h$ .

# Practice Problems

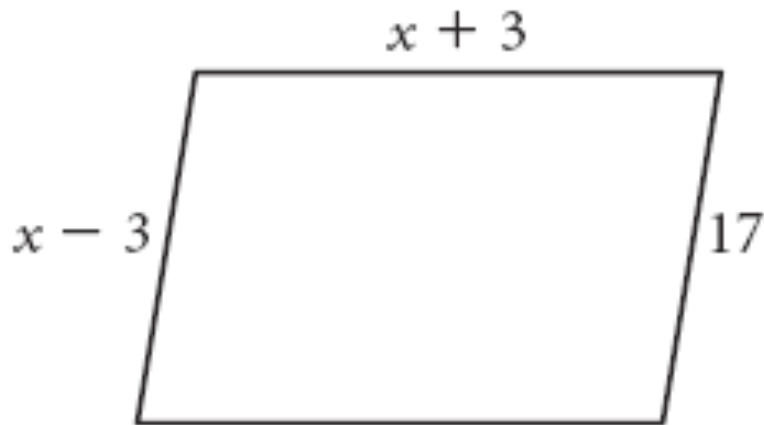
$VF = 36$  m  
 $EF = 24$  m  
 $EI = 42$  m  
What is the perimeter of  $\triangle NVI$ ? [h](#)

63 m. Use the Parallelogram Diagonals Conjecture to find  $VN = \frac{1}{2}(VF) = 18$  m and  $NI = \frac{1}{2}(EI) = 21$  m, and use the Parallelogram Opposite Sides Conjecture to find that  $VI = EF = 24$  m. Then the perimeter of  $\triangle NVI = 18 + 21 + 24 = 63$  m.



# Practice Problems

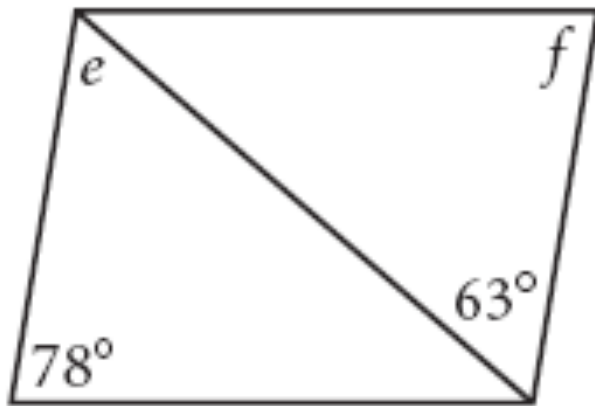
What is the perimeter?



80. By the Parallelogram Opposite Sides Conjecture,  $x - 3 = 17$ , so  $x = 20$ , and therefore,  $x + 3 = 23$ . Therefore, the perimeter of the parallelogram is  $2 \cdot 17 + 2 \cdot 23 = 34 + 46 = 80$ .

# Practice Problems

$$e = \underline{\quad? \quad}$$
$$f = \underline{\quad? \quad}$$



$e = 63^\circ$ ,  $f = 78^\circ$ . By the definition of a parallelogram, both pairs of opposite sides are parallel, so  $e = 63^\circ$  by the AIA Conjecture, and  $f = 78^\circ$  by the Parallelogram Opposite Angles Conjecture.