

Investigating Limits

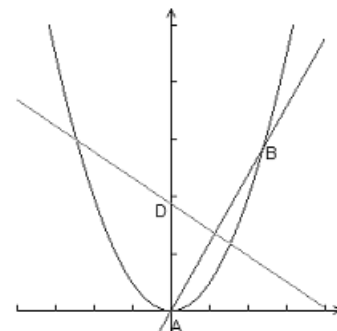
CC Edwards

CALCULATORS: Casio: *ClassPad 300 • ClassPad 300 Plus • ClassPad Manager*
 TI: *TI-89, TI-89 Titanium • Voyage 200*

The Casio ClassPad 300

The figure shows a point **B** on the parabola $y = x^2$ and the point **D** where the perpendicular bisector of **AB** intersects the y -axis.

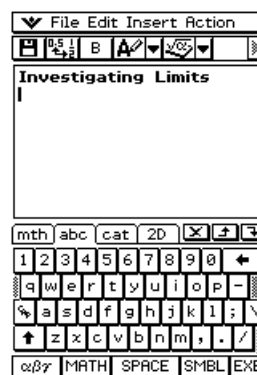
As **B** approaches the origin along the parabola, what happens to **D**? Does it have a limiting position? If so, find it.



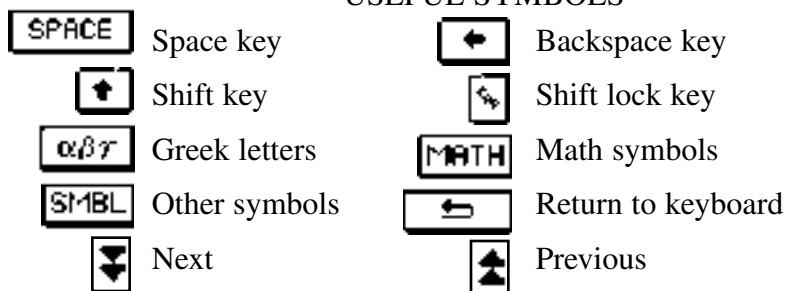
Here's how you solve this problem using the ClassPad 300:

Start an eActivity.

1. On the Silk Screen Menu Bar tap **MENU**.
2. Tap the **eActivity** icon.
3. On the Menu Bar tap **File/New**. If you're asked to clear the screen, tap **OK**.
4. Enter a title:
 - Press **Keyboard** and tap **abc**.
 - On the Toolbar, tap **B** (for bold).
 - Enter **Investigating Limits** by tapping the appropriate letters on the keypad.
 - Tap **EXE** when finished.

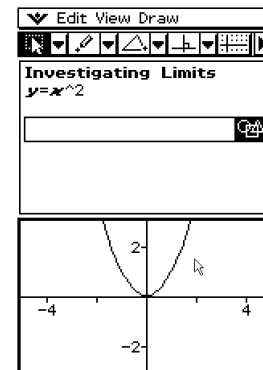


USEFUL SYMBOLS



Graph the Function.

1. On the Keyboard, tap **math**.
2. To enter the function, tap **VAR** $y = x^2$ **EXE**.
3. On the Menu Bar tap **Insert/Geometry**.
4. In the top eActivity window, drag the stylus over $y = x^2$ to highlight it.
5. Lift the stylus, tap the highlighted function and drag it to the geometry window (the bottom window).
6. On the Toolbar, tap to display the axes. Tap again to display the values of the tick marks.




Investigating Limits

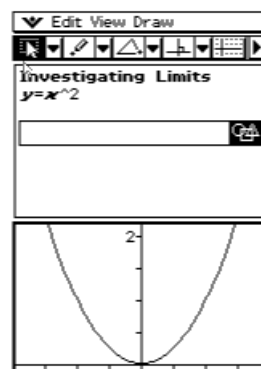
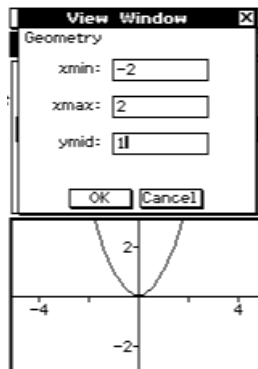
(continued)

CALCULATORS: Casio: *ClassPad 300 • ClassPad 300 Plus • ClassPad Manager*
 TI: *TI-89, TI-89 Titanium • Voyage 200*

The Casio ClassPad 300



7. Adjust the graphing window:

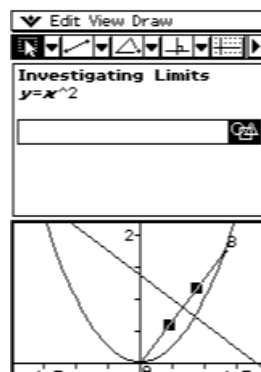
- On the Menu Bar, tap /Settings/View Window.
- Set **xmin**, **xmax**, and **ymid** to -2, 2, 1, respectively.
- Tap **OK**.





Construct the Points B and D.

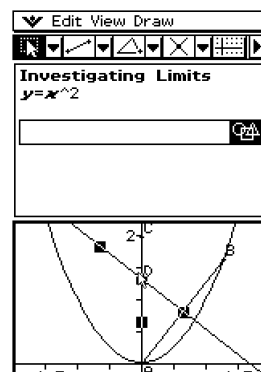
1. Construct segment AB:

- Tap  to the right of the second drop down menu.
- Tap  to select the segment tool.
- Tap the **origin**.
- Tap the **origin** again and drag the stylus to another point on the parabola.




2. Construct the perpendicular bisector of AB:



- Tap  in the first drop down menu to select the selection tool.
- Tap the segment **AB** to select it.
- Tap  in the fourth drop down menu.

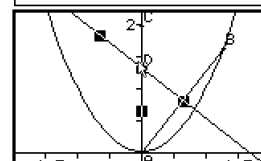


3. Create a line on the y-axis:

- Tap  in the second drop down menu
- Tap point **A**.
- Tap another point, **C**, on the y-axis.

4. Create point D, the intersection of the perpendicular bisector and the y-axis:

- Tap  in the first drop down menu.
- Tap the perpendicular bisector and tap the **y-axis**.
- Tap  in the fourth drop down menu.



Investigating Limits

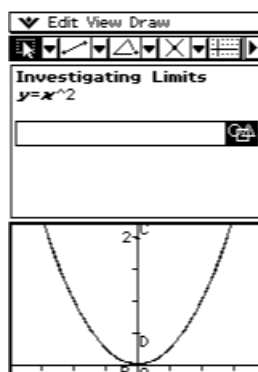
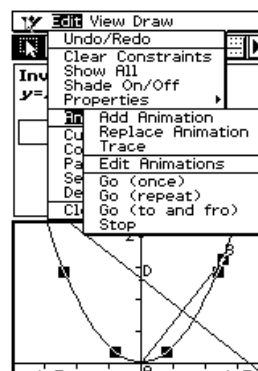
(continued)

CALCULATORS: Casio: *ClassPad 300* • *ClassPad 300 Plus* • *ClassPad Manager*
TI: *TI-89*, *TI-89 Titanium* • *Voyage 200*

The Casio ClassPad 300

Animate the Graph to Investigate Point D.

1. Tap on a **blank space** in the Geometry window.
2. Tap the parabola and point B to select them. Then tap **Edit/Animate/Add Animation**.
3. To trace the movement of point B along the parabola:
 - Tap on a **blank space** in the Geometry window.
 - Tap **B**.
 - Tap **Edit/Animate/Trace**.
4. To investigate the movement of point D along the y-axis:
 - Tap on a **blank space** in the Geometry window.
 - Tap **Edit/Animate/Go** (once).



TIP: If the perpendicular bisector interferes with your view of point **D**, tap the perpendicular bisector and tap **Edit/Properties/Hide**. Then repeat step 4.

CONCLUSION: As **B** approached the origin, **D** approaches 0.5.

Investigating Limits

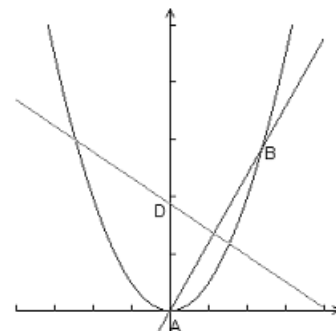
CC Edwards

CALCULATORS: Casio: *ClassPad 300* • *ClassPad 300 Plus* • *ClassPad Manager*
TI: *TI-89*, *TI-89 Titanium* • *Voyage 200*

The TI-89

The figure shows a point **B** on the parabola $y = x^2$ and the point **D** where the perpendicular bisector of **AB** intersects the y-axis.

As **B** approaches the origin along the parabola, what happens to **D**? Does it have a limiting position? If so, find it.



On the ClassPad you can visually investigate the limit without using calculus by using a geometry program that seamlessly communicates with the ClassPad. For example, on the ClassPad you can drag a function to a Geometry window to graph it.

On a TI calculator you can (with the exception of dragging) do the same thing by using a TI geometry program that does not work seamlessly with the calculator. All ClassPad programs work the same way - if you know how to use menus in one ClassPad program, you know how to use them in all ClassPad programs. The geometry programs on the TI calculators are independent programs that don't work seamlessly with the calculator. To use a TI geometry program you need to need to learn a whole new set of instructions.

THE CASIO ADVANTAGE

- On the *ClassPad 300*, you can visually investigate the limit without using calculus by using a geometry program that seamlessly communicates with the calculator. For example, you can drag the function to a geometry window and graph it.

To do this on the TI, you must go into a separate geometry application that does not work seamlessly with the calculator and has its own set of instructions.