Exciting Activities with TI-nspire that Address the Common Core Standards for Algebra 2

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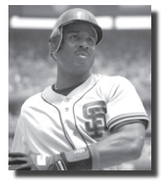
Problem 1: How many bases were stolen by Barry Bonds and Willy Mays

Problem 1

Willy Mays

Willy Mays and Barry Bonds were two of the greatest players in baseball.



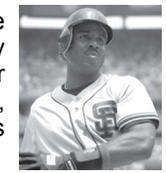
Barry Bonds

During their careers, Barry Bonds and Willie Mays scored 762 and 660 home runs respectively. Also Barry Bonds stole 176 more bases than Willie Mays.

If Barry Bonds has a power/speed number that is about 166.85 greater than Willie Mays' power/speed number, how many bases did each of them steal?

Problem 1

We let x denote the number of bases stolen by Willie Mays. The career stolen bases, home runs, and power/speed numbers are given in the table.



	Barry Bonds	Willie Mays
Home Runs	762	660
Stolen Bases	$x + 176$	x
Power/Speed	$h(x + 176, 762)$	$h(x, 660)$

Problem 1

	Barry Bonds	Willie Mays
Home Runs	762	660
Stolen Bases	$x + 176$	x
Power/Speed	$h(x + 176, 762)$	$h(x, 660)$

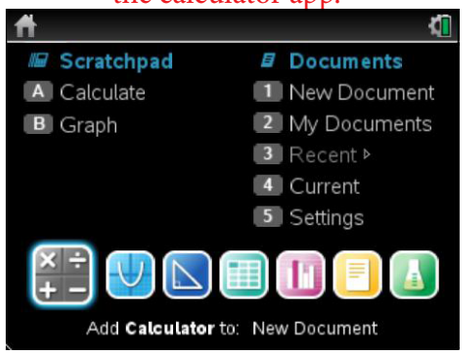
If x denotes the number of bases stolen by Willie Mays, then the condition that Barry Bonds has a power/speed number that is about 166.85 greater than Willie Mays' power/speed number, is given by:

$$h(x + 176, 762) - h(x, 660) \approx 166.85$$

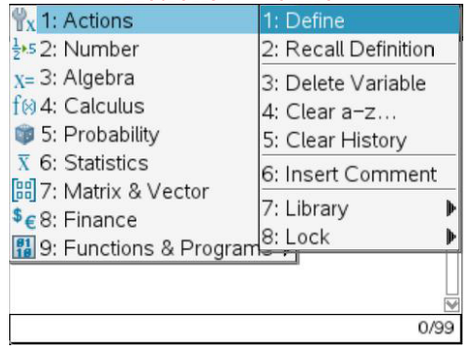
Barry Bonds' power/speed #

Willy Mays' power/speed #

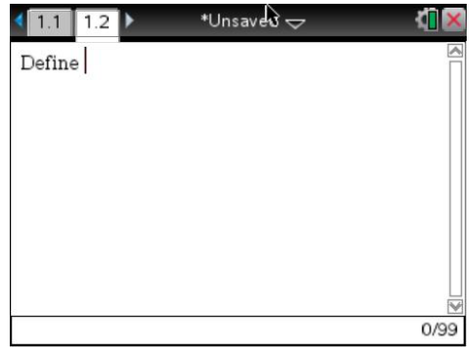
Click on the Home Key and access the calculator app.



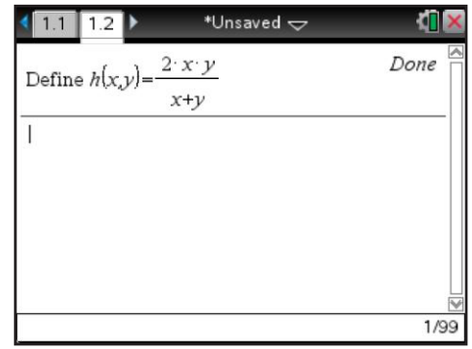
Press menu and select: Actions > Define



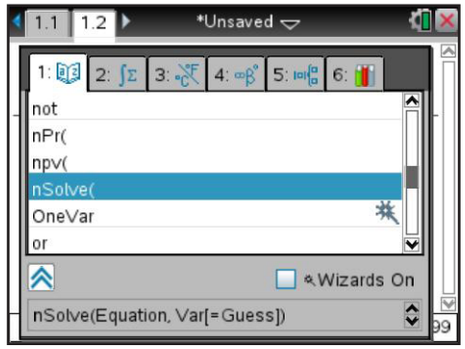
The Define command appears



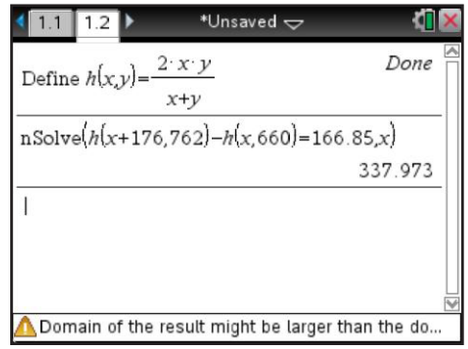
Define $h(x, y)$ as in the display.



Use the catalog key to access nSolve



Enter the nSolve(command as shown



Substitute $x = 338$ into the table

Problem 1

Substituting $x = 338$, we obtain the following table:

	Barry Bonds	Willie Mays
Home Runs	762	660
Stolen Bases	514	338
Power/Speed	613.90	447.05

The difference in their power/speed numbers is:

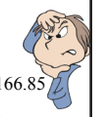
$613.90 - 447.05 \approx 166.85$

Verifying that our answer is correct!

Compare the solutions with and without technology

Problem 1

Without technology:



Solve for x: $\frac{2(762)(x + 176)}{(x + 938)} - \frac{2(660)x}{(x + 660)} \approx 166.85$

Barry Bonds' power/speed #

Willy Mays' power/speed #

With technology:

Solve for x: $h(x + 176, 762) - h(x, 660) \approx 166.85$

$\text{nSolve}(h(x+176,762)-h(x,660)=166.85,x)$

Problem 2: How long does it take a pizza to cool to room temperature?

Problem 2

The temperature in ˚F of a pizza, x minutes after it comes out of the oven is:

$f(x) = 75 + 275 \times 10^{-0.028x}$

a) Graph $f(x)$ in the window: $-10 \le x \le 100$; $-10 \le y \le 50$

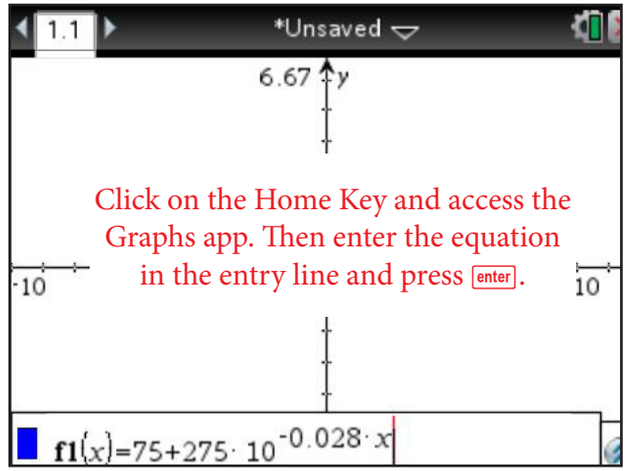
What is the temperature of the pizza:

i) When it comes out of the oven?

ii) 20 minutes later?

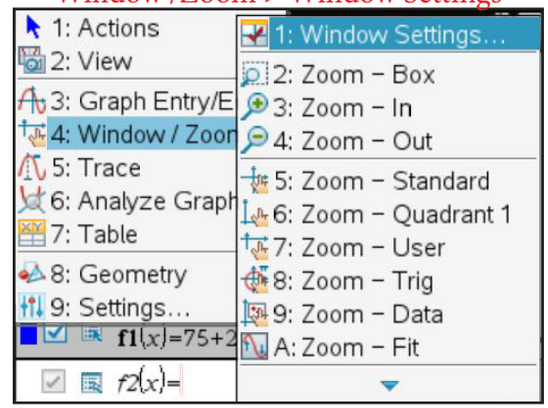
iii) 30 minutes later?

b) How long does it take the pizza to reach room temperature (i.e., 76˚F)?

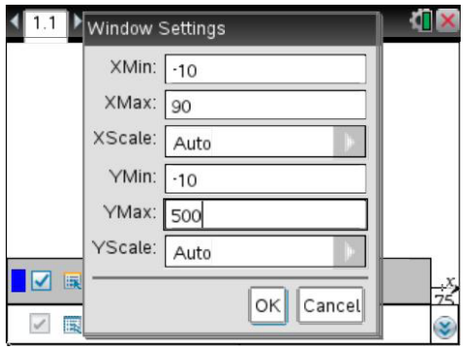


Click on the Home Key and access the Graphs app. Then enter the equation in the entry line and press enter.

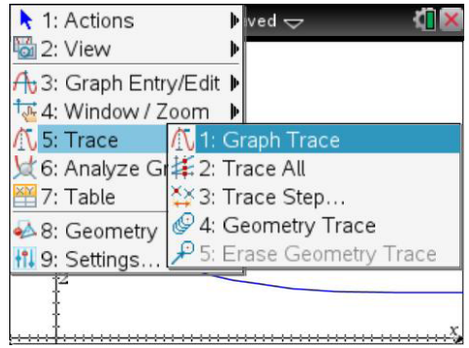
Press the menu key and select Window /Zoom > Window Settings



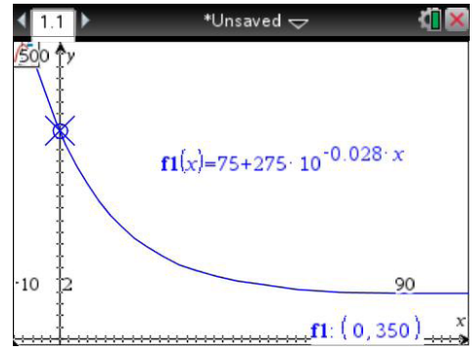
Complete the template as in the display and press enter.



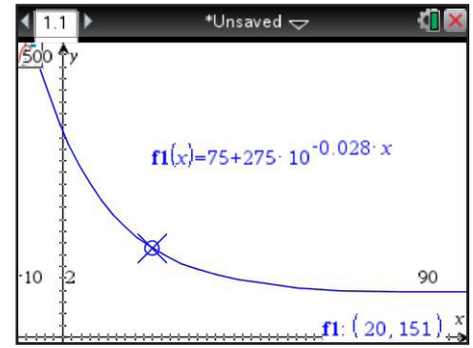
Press the menu key and select: Trace > Graph Trace and press enter.



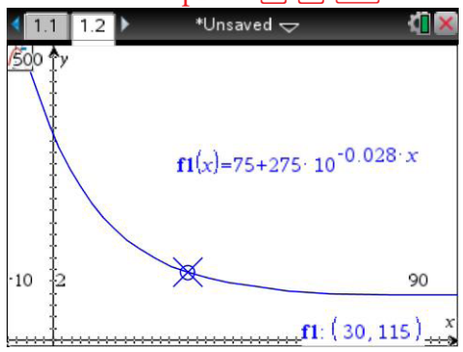
To find the temperature at time $x = 0$ we press: 0 enter.



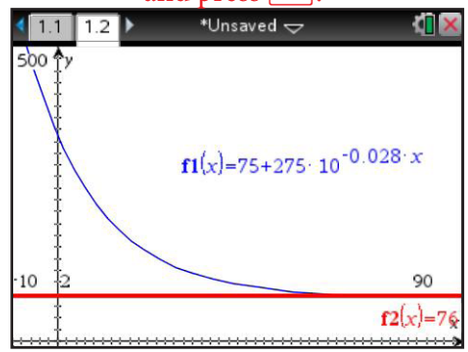
To find the temperature at time $x = 20$ we press: 2 0 enter.



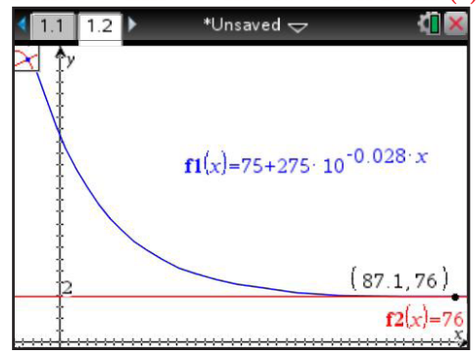
To find the temperature at time $x = 30$ we press: 3 0 enter.



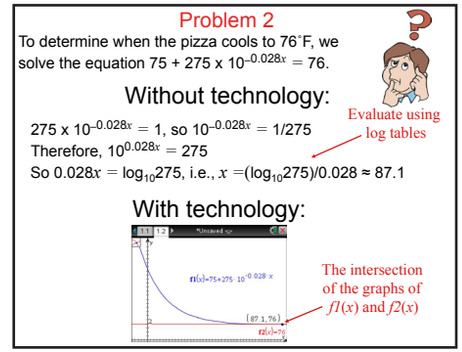
Enter f2(x) = 76 in the entry line and press enter.



Press menu and select Geometry > Points & Lines > Intersection Point(s)



Compare the solutions with and without technology



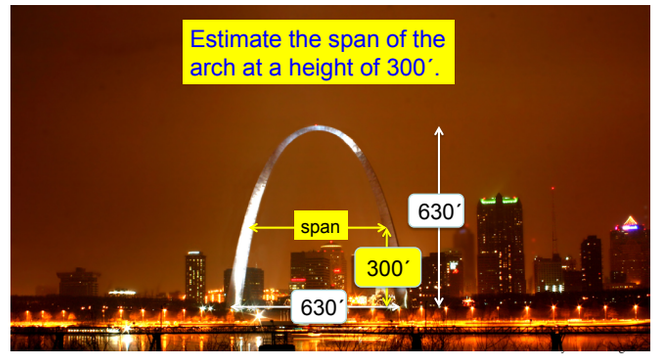
Problem 3: Estimate the span of the St. Louis Arch at a height of 300 feet

Problem 3

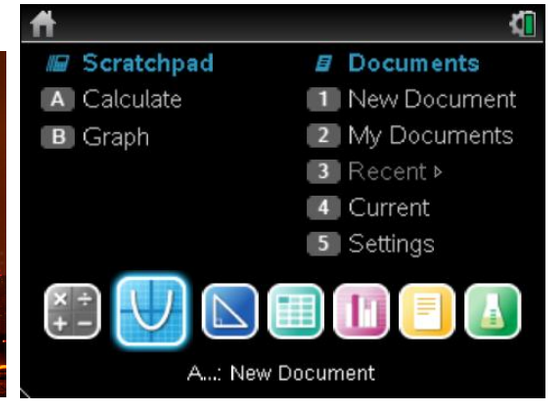
The majestic Gateway Arch in St. Louis is almost parabolic in shape.

Problem 3

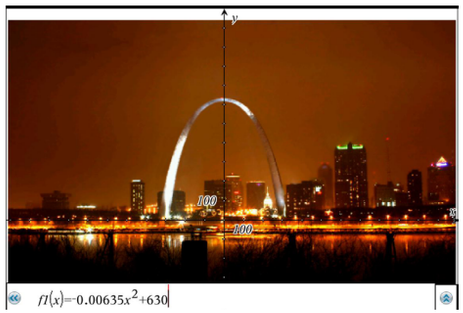
The Gateway Arch can be modeled by the parabola with equation $y = 0.00635x^2 + 630$.



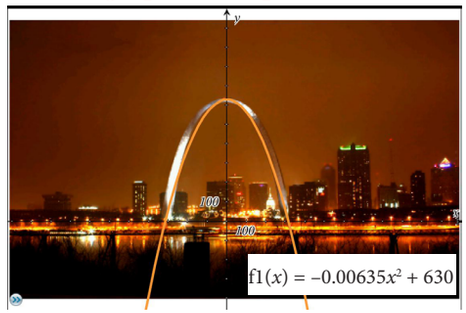
Access Geometry & Graphs



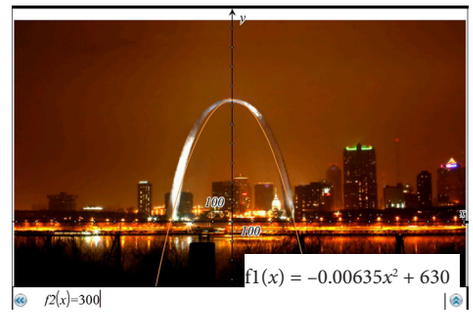
Enter $f1(x) = -0.00635x^2 + 630$



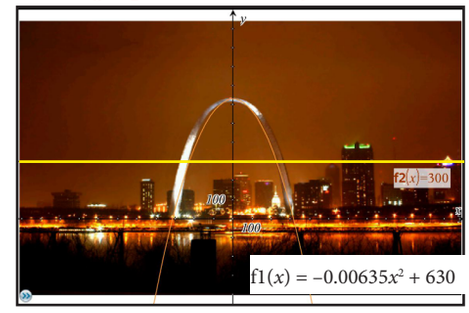
Press ENTER to see the graph of the parabola



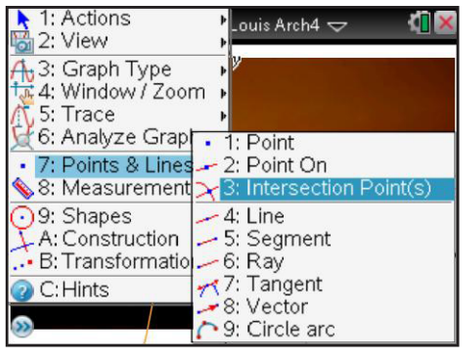
Enter $f2(x) = 300$



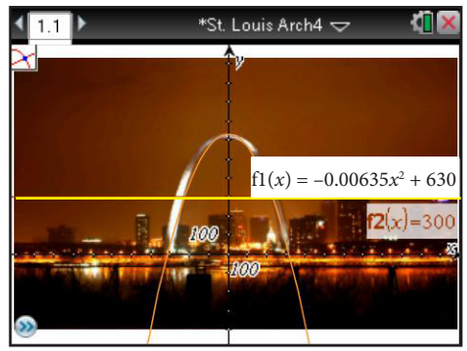
Press ENTER to see the graph of the line $y = 300$



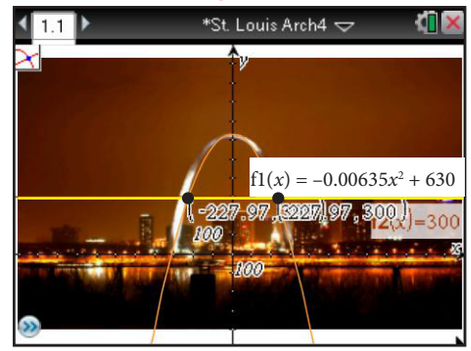
Press menu and select:
Points & Lines > Intersection Points



Click on the graph of the parabola and on the graph of $y = 300$.



Intersection points are (−228, 300) and (228, 300) so the span is about 456 feet at a height of 300 feet.



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