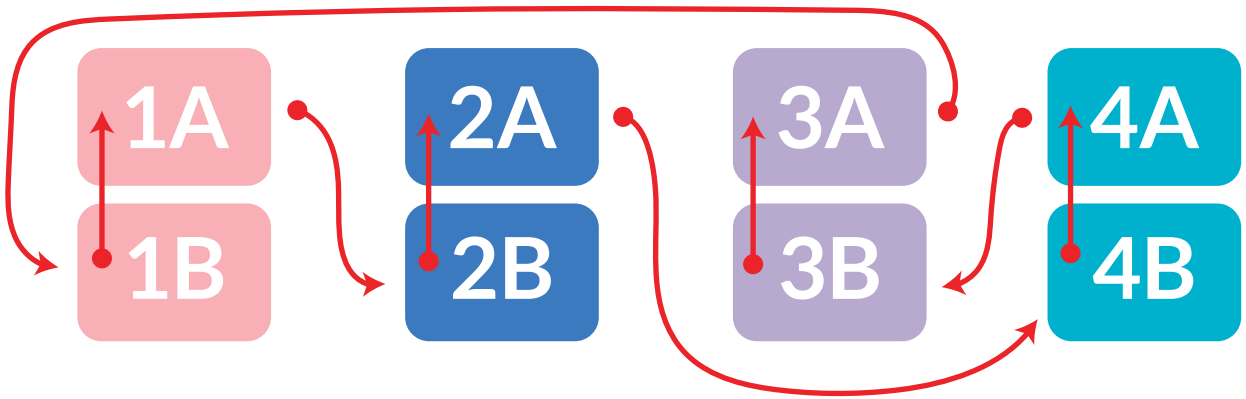
Precalculus Scavenger Hunt

This scavenger hunt will refresh students' math knowledge while practicing their TI-84 graphing calculator skills. This .PDF includes: Student answer sheets, Q/A posters to hang around the room and teacher answer/hint sheet .

Set up: Print posters on 8.5 x 11 in. paper in landscape format. Hang posters around the room (or hallway, tables, etc.) in their numbered pairs, with #A posters above their coordinating #B poster. Each poster set is a "station".

The Hunt: Students can start at any poster "station." The hunt will move students in a loop. #A posters ask a question. #B posters house an answer. Students must find the #B poster with the correct answer and then solve the question of the #A poster above it to continue.

Poster station set up and student movement example:



Student Directions

Start at your assigned poster station.

Each station has two posters.
The top posters have questions.
The bottom posters have answers.

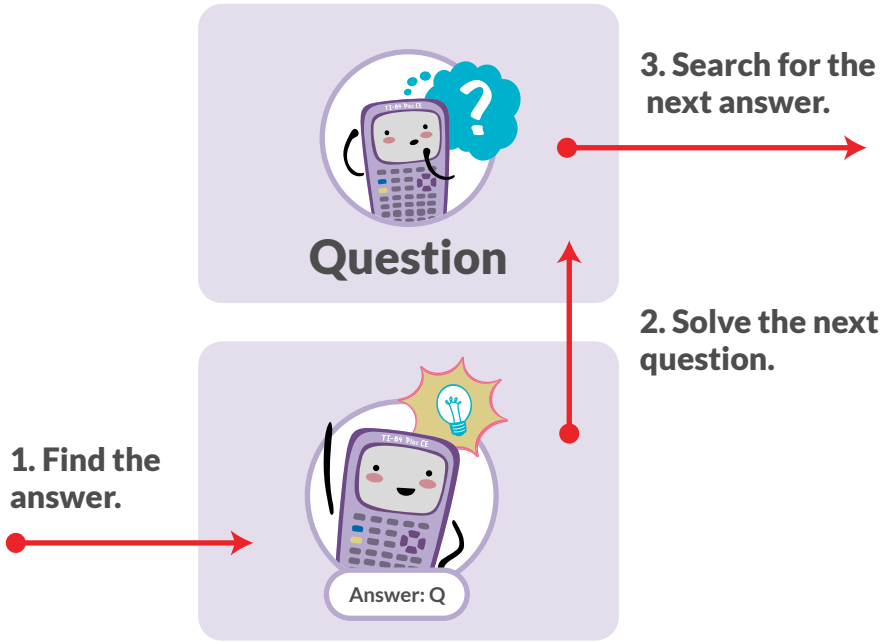
Oh no! The answers are mixed up! You will have to find the correct answer **at another station**.
(Hint: You will not be moving in a single direction.)

When you find the bottom poster with the correct answer to your question, write the **answer letter** on the poster next to the question number on your answer sheet.

To move on, answer the question on the top poster of your new poster station.

This hunt will loop. When you arrive back at your first question, you've finished the hunt!

Poster Station Example



Answer Sheet Example

Q: 1	A: G
Q: 2	A: P
Q: 3	A: R

Student Answer Sheet

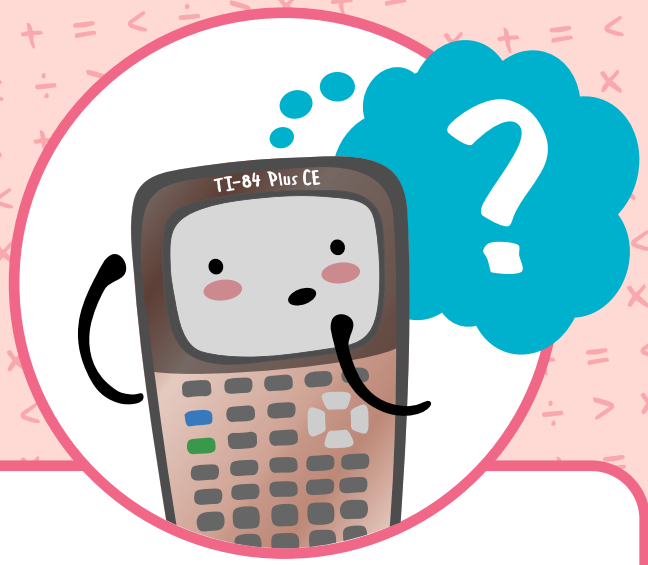
Question Number	Answer Letter	Show your work, write down your calculator key presses, or describe your method.
1		
2		
3		
4		
5		
6		
7		
8		
9		

Student Answer Sheet

Question Number	Answer Letter	Show your work, write down your calculator key presses, or describe your method.
10		
11		
12		
13		
14		
15		
16		
17		
18		

BONUS: What calculator feature gives you a SEARCHABLE menu of ALL available functions/operations?

1 A



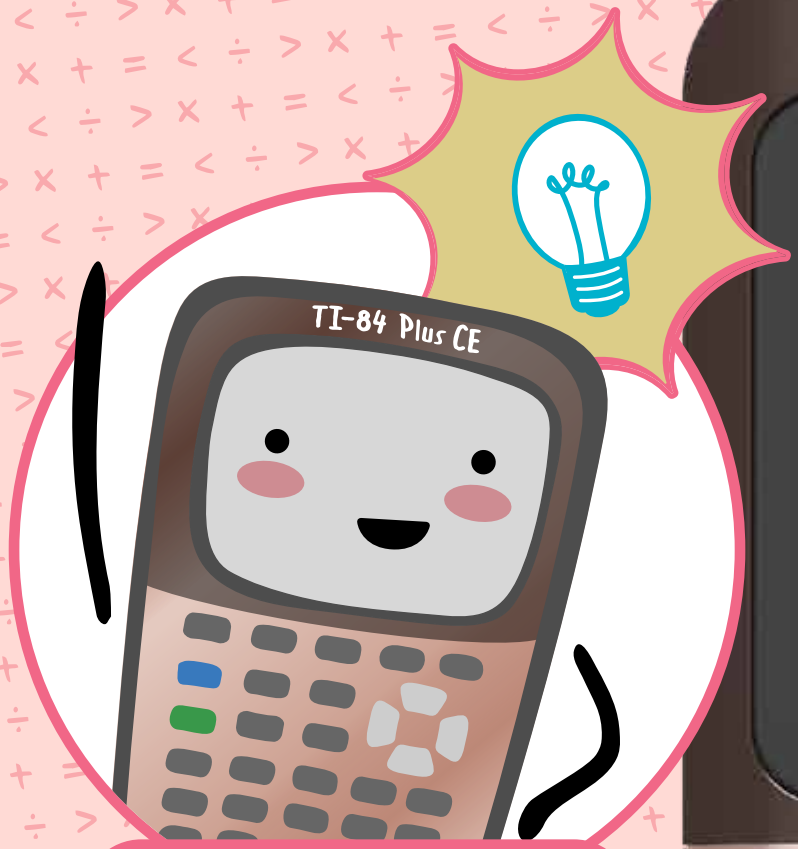
Find the graph that shows the solution for this system of inequalities.

Evaluate:

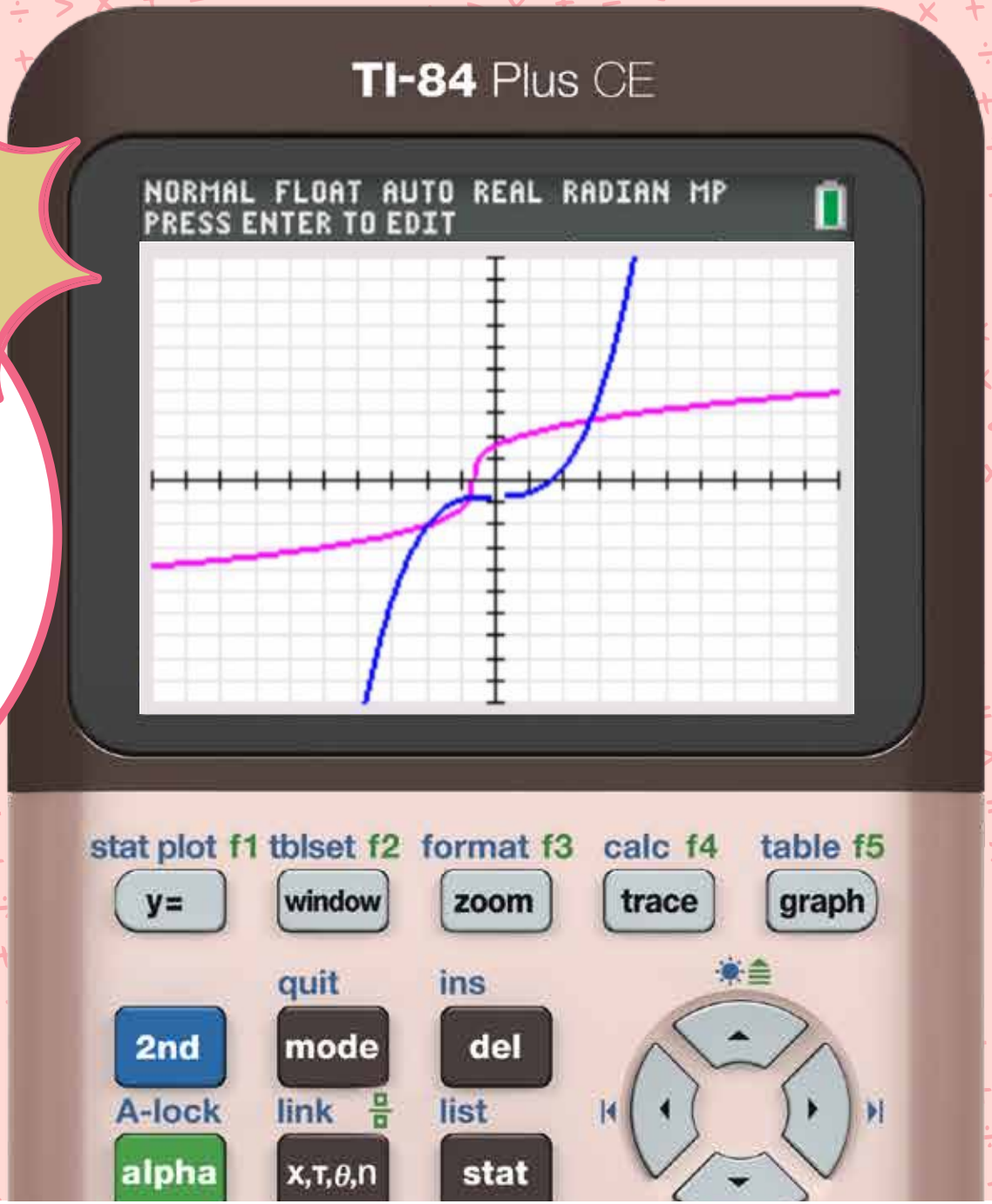
$3x - 2y > 4$

$3x + 4y \leq 20$

1B


TI-84 Plus CE

Answer: N


TI-84 Plus CE
NORMAL FLOAT AUTO REAL RADIAN MP
PRESS ENTER TO EDIT
stat plot f1
tblset f2
format f3
calc f4
table f5
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X,T,θ,n
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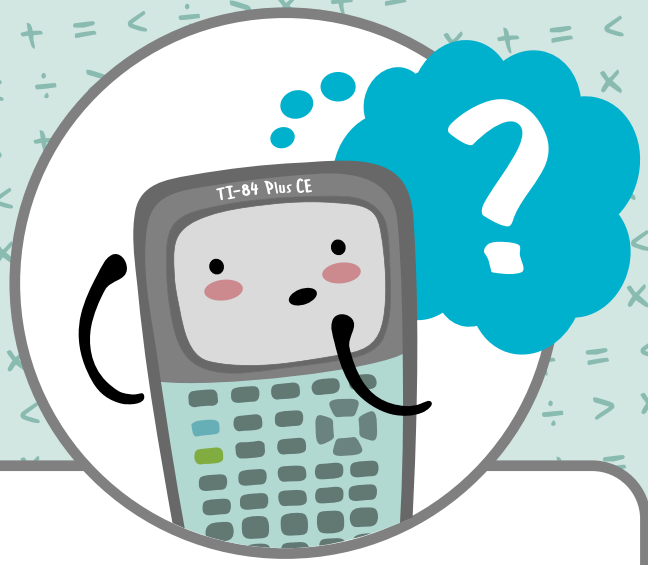
2 A



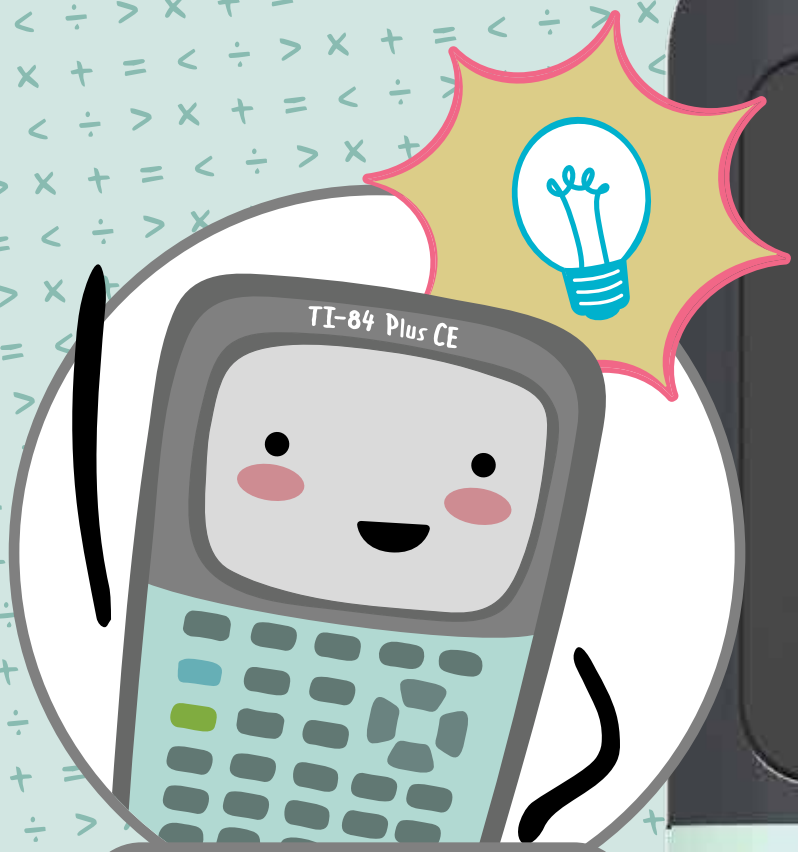
Find the inverse of the function algebraically.

Then find the graph of the function and its inverse.

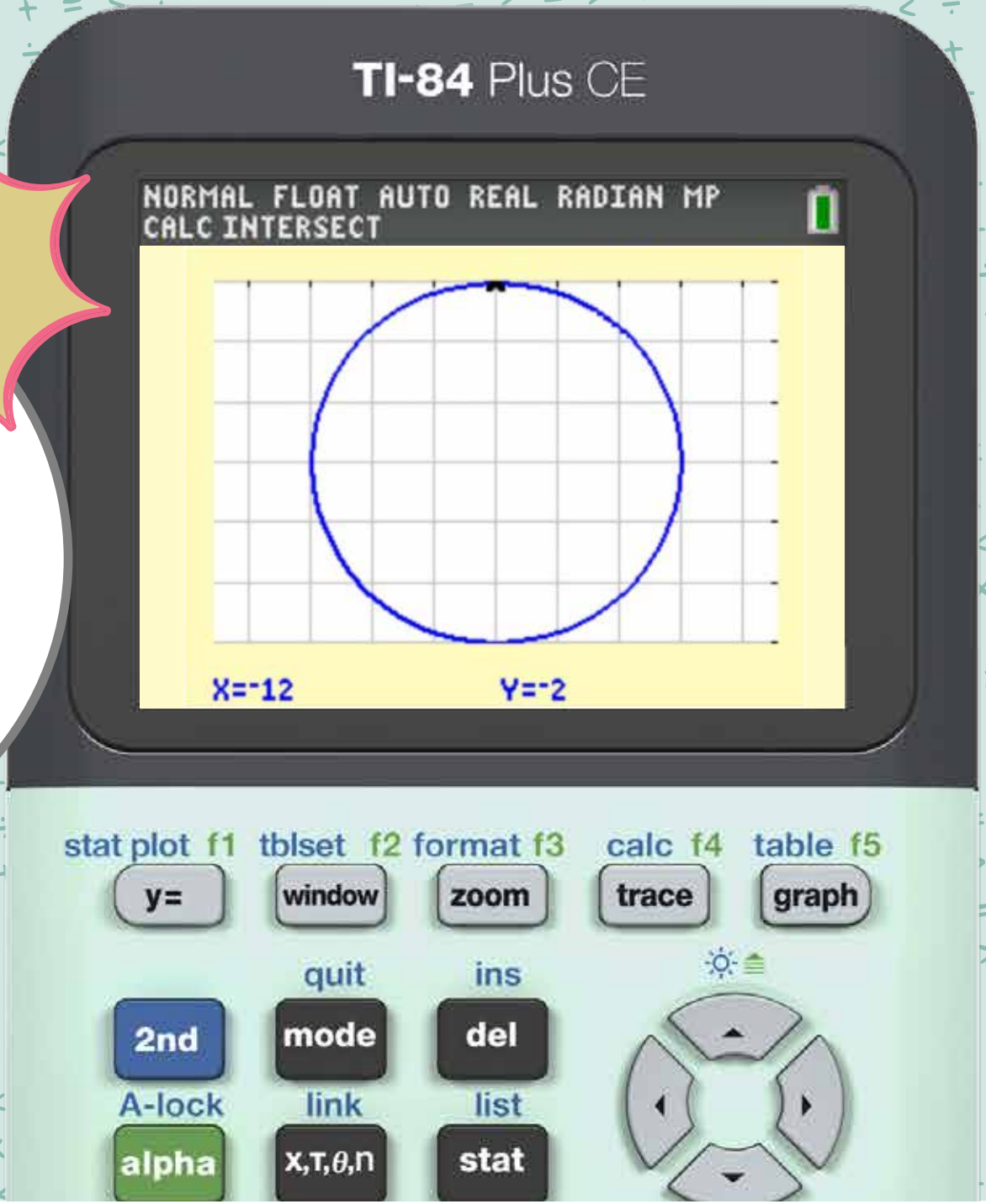
Evaluate:

$f(x) = 2x^3 - 2$

2B


TI-84 Plus CE

Answer: I


TI-84 Plus CE
NORMAL FLOAT AUTO REAL RADIAN MP
CALC INTERSECT
X=-12
Y=-2
stat plot f1
tblset f2
format f3
calc f4
table f5
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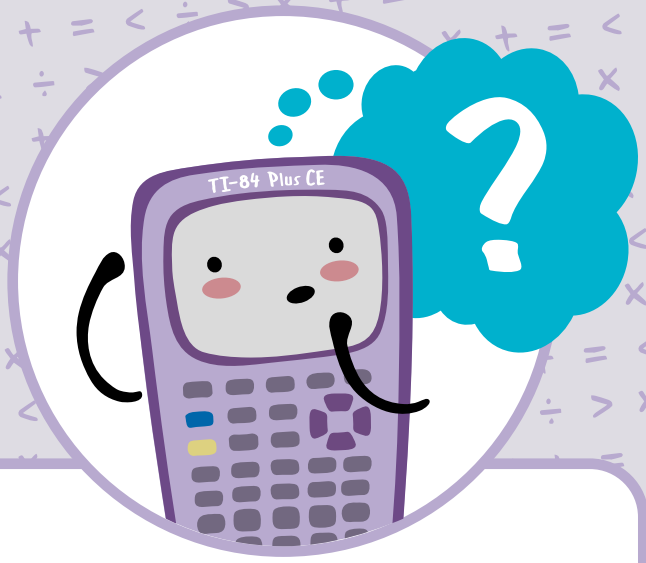
3 A



Find the graph that shows *(f-g)(x)* with the associated table that shows:

(f-g)(-3)

(f-g)(2)

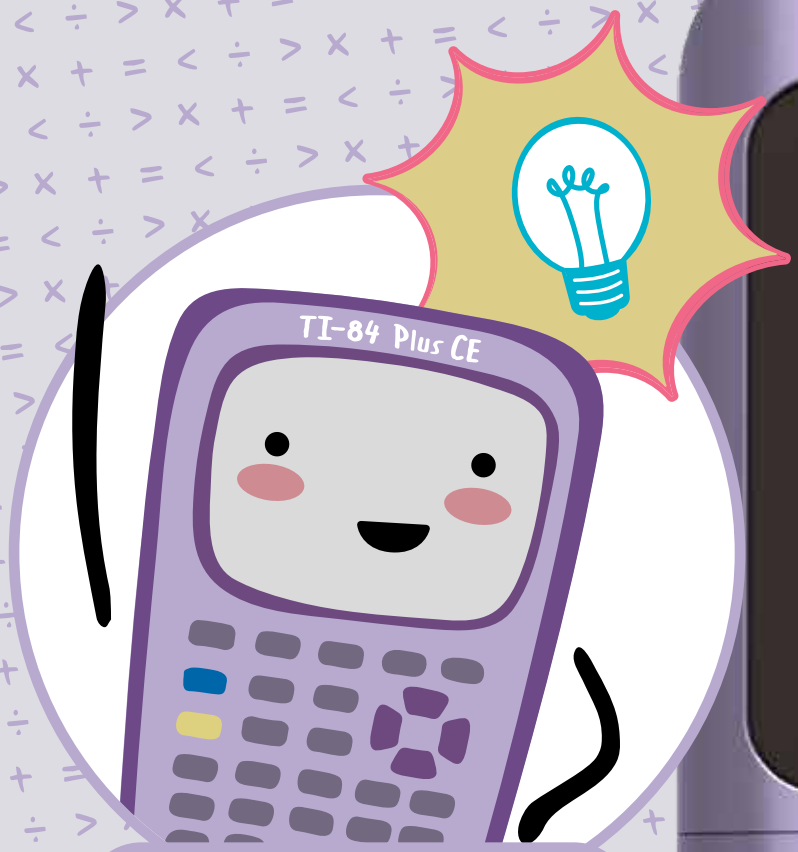
(f-g)(7)

Given:

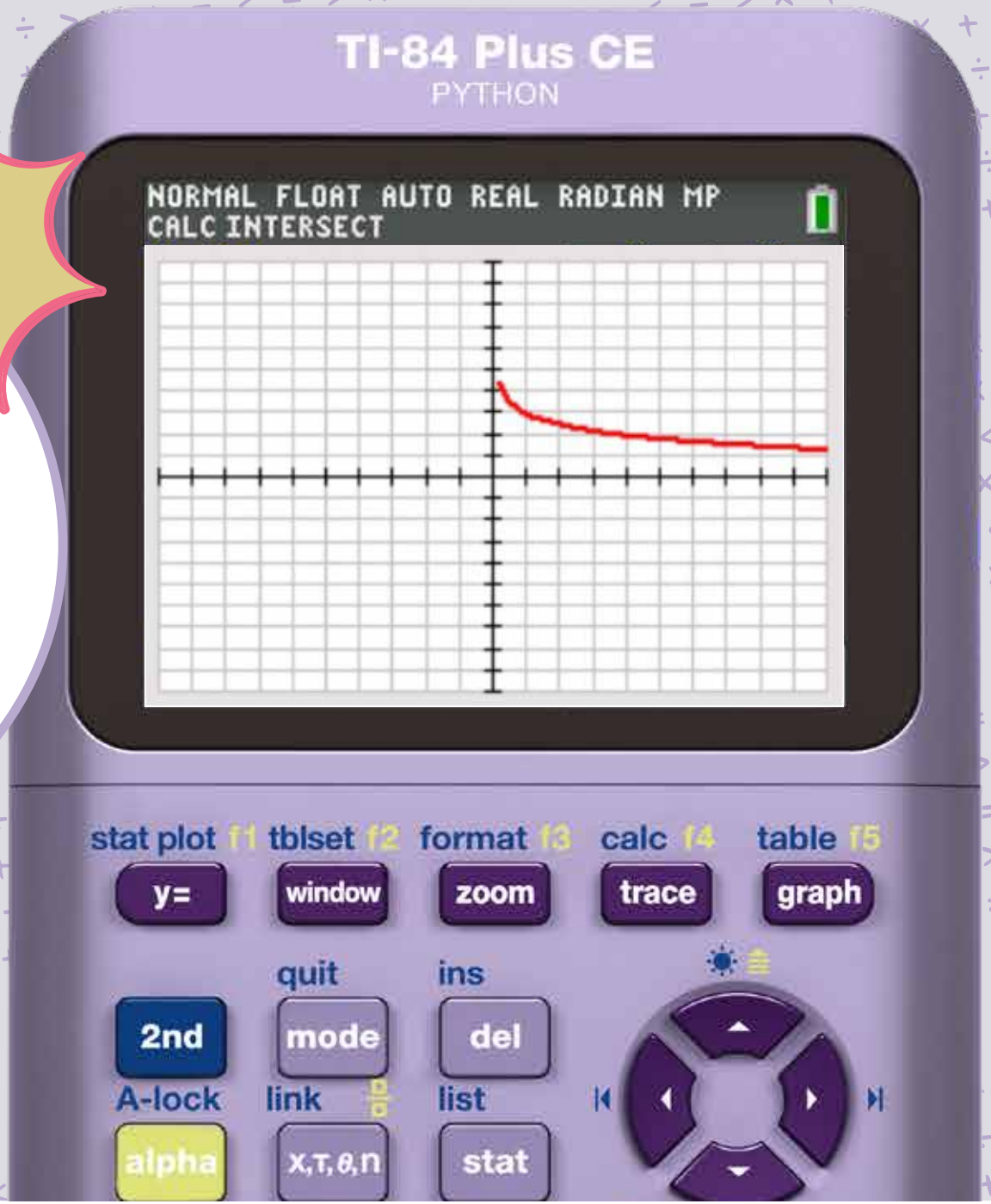
$f(x) = 4x^2 + 3x + 2$

$g(x) = 2x^2 - 5x - 6$

3 B


TI-84 Plus CE

Answer: E


TI-84 Plus CE
PYTHON
NORMAL FLOAT AUTO REAL RADIAN MP
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stat plot f1
tblset f2
format f3
calc f4
table f5
y=
window
zoom
trace
graph
quit
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A-lock
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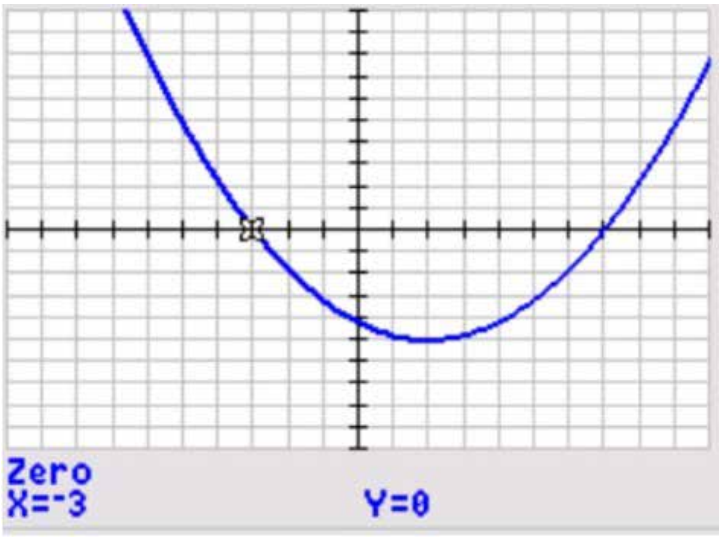
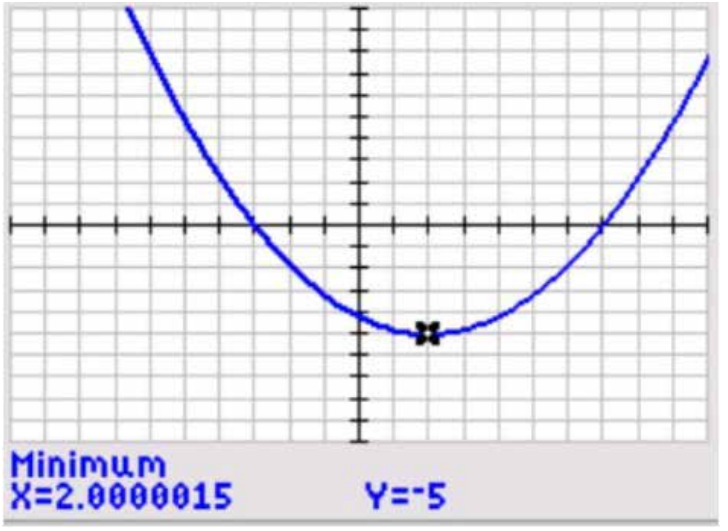
list
alpha
X,T,θ,n
stat

4 A

Use the graphs of the parabola. They show the minimum and an x-intercept of the function. Write the equation for the parabola.

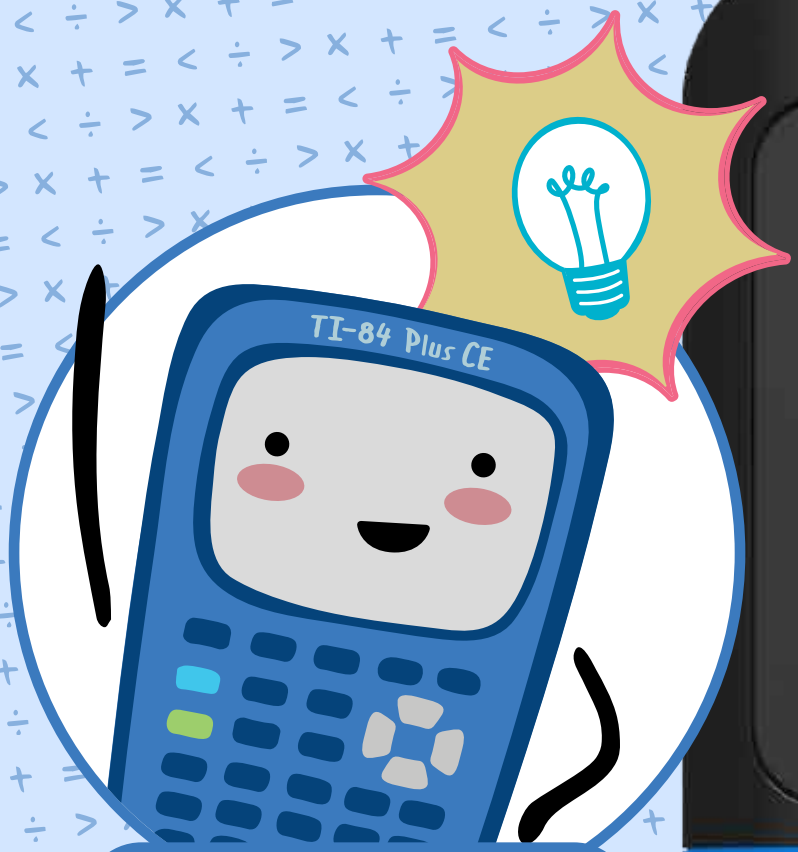
Then, use your equation, to find the matching table of values.



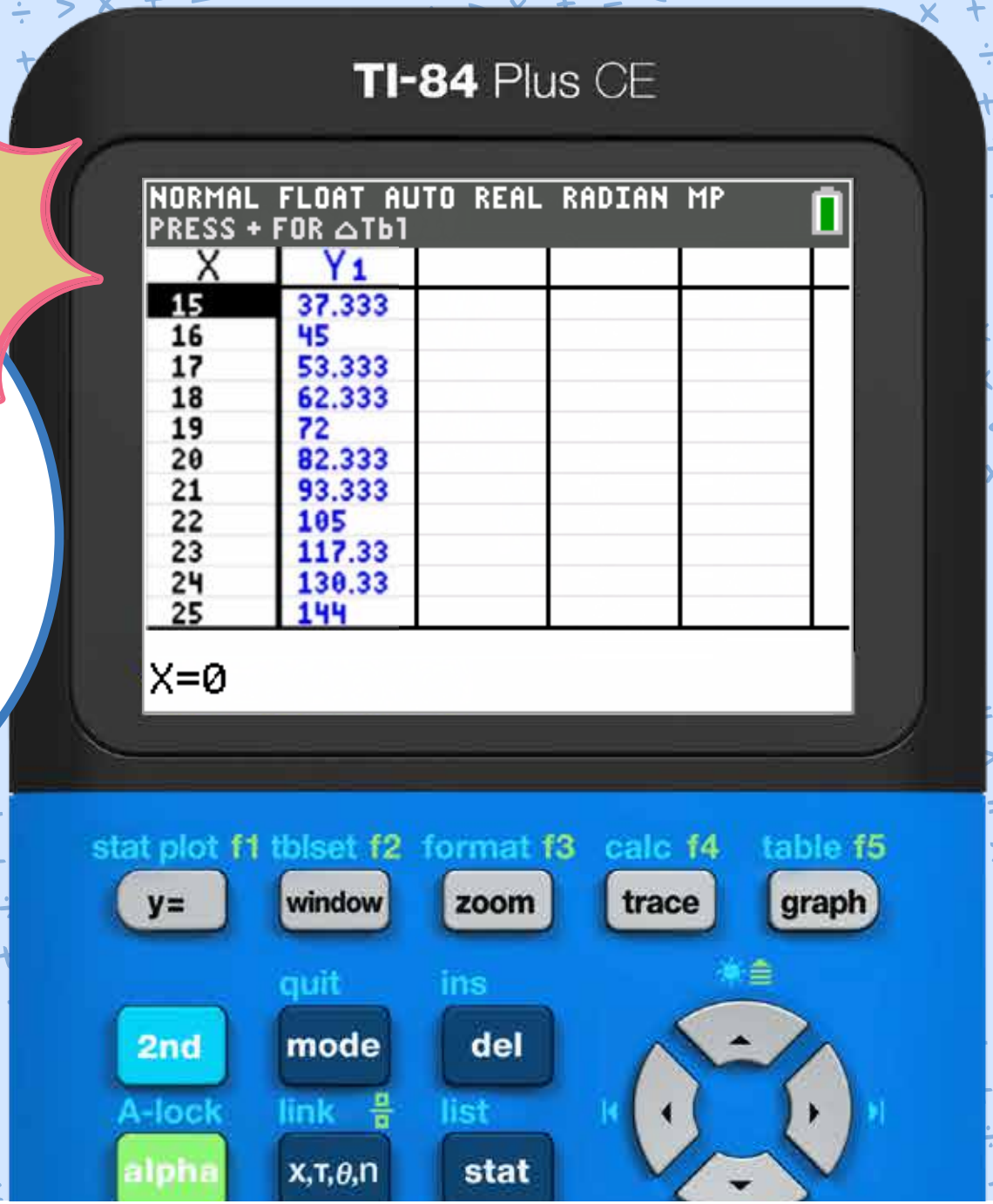


Note: The minimum is (2,-5)

4 B


TI-84 Plus CE

Answer: D


TI-84 Plus CE
NORMAL FLOAT AUTO REAL RADIAN MP
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X
Y1
15 37.333
16 45
17 53.333
18 62.333
19 72
20 82.333
21 93.333
22 105
23 117.33
24 130.33
25 144
X=0
stat plot f1
tblset f2
format f3
calc f4
table f5
y=
window
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graph
quit
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X,T,θ,n
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5 A

Find the solution for the following system of equations algebraically.

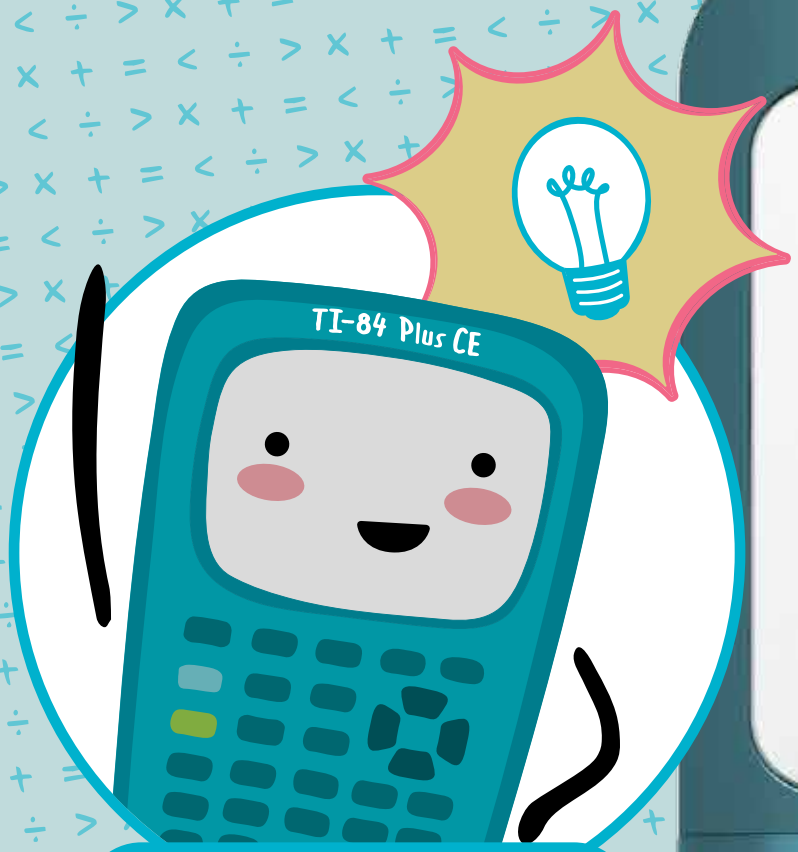
Then check your solution by finding the graphical solution.

Evaluate:

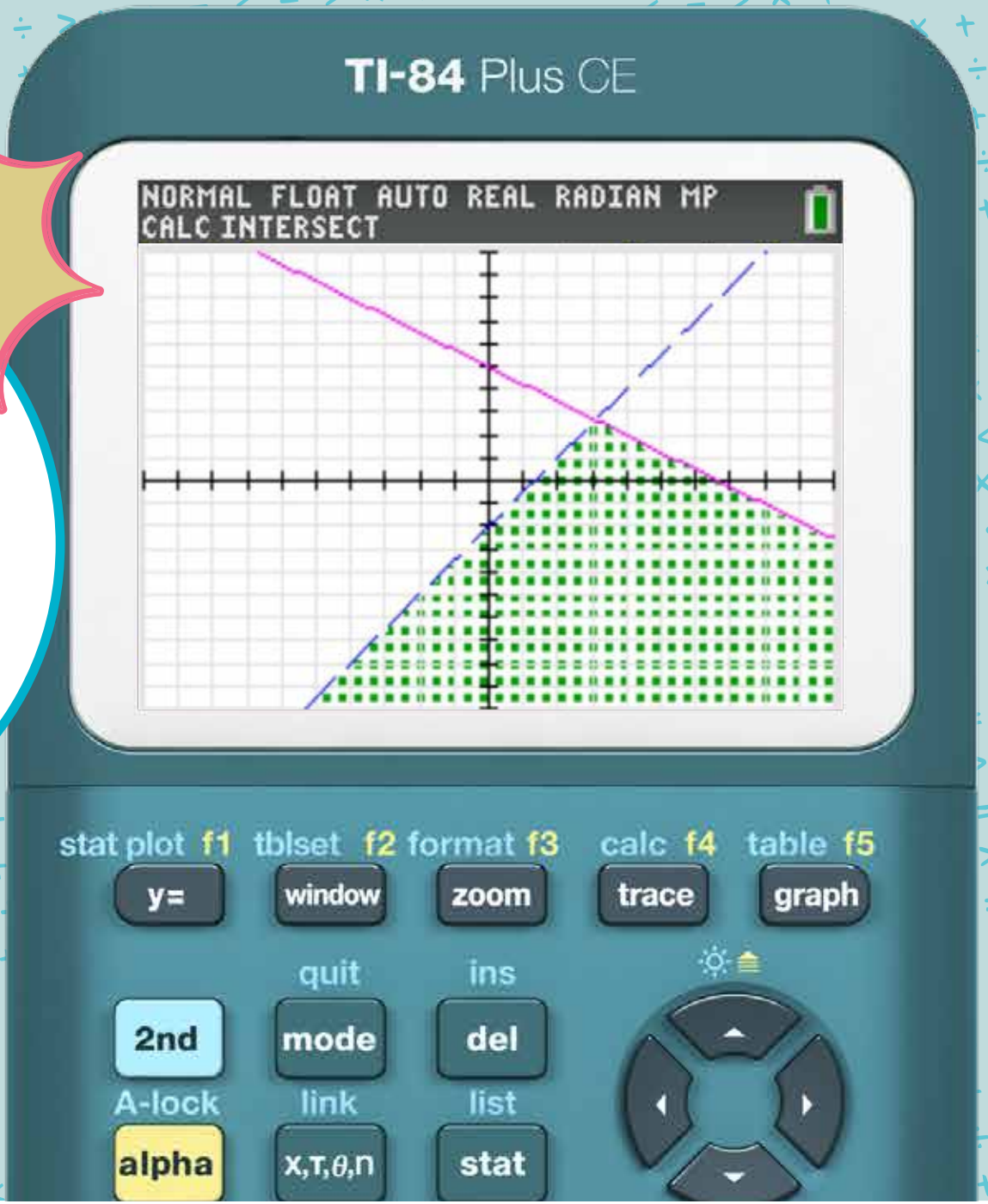
$y = -x^2 + 2x + 7$

$y = -2x^2 + 2$

5 B


TI-84 Plus CE

Answer: J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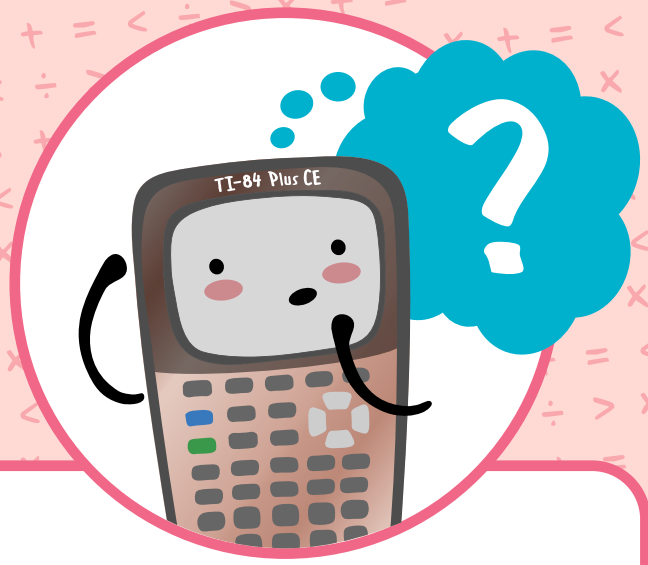
6 A



Find the graph showing the solution for the system of inequalities.

Evaluate:

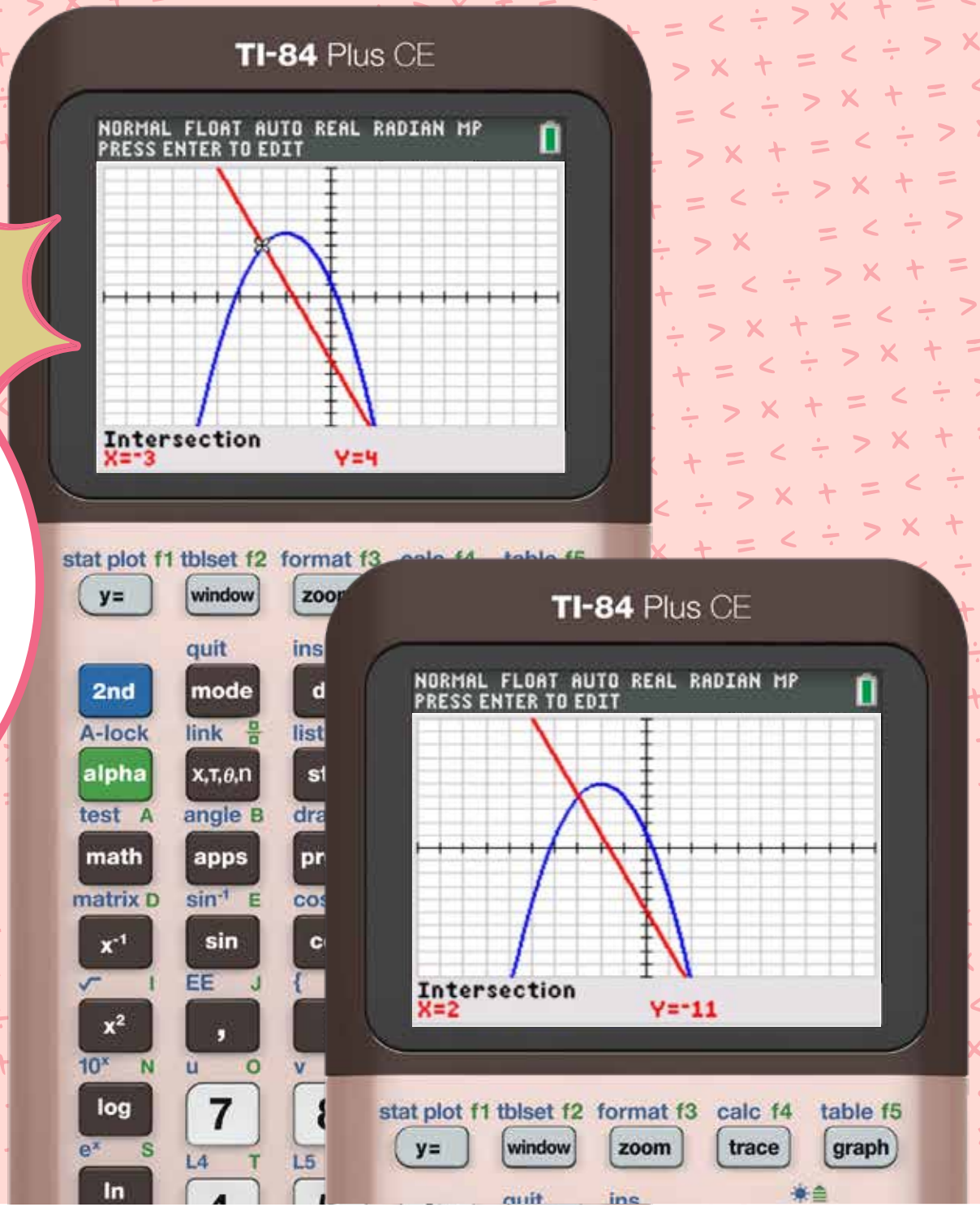
$2y + 3x \leq 4$

$4x - y < 2$

6 B


TI-84 Plus CE

Answer: K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Intersection
X=-3
Y=4
stat plot f1 tblset f2 format f3
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TI-84 Plus CE
NORMAL FLOAT AUTO REAL RADIAN MP
PRESS ENTER TO EDIT
Intersection
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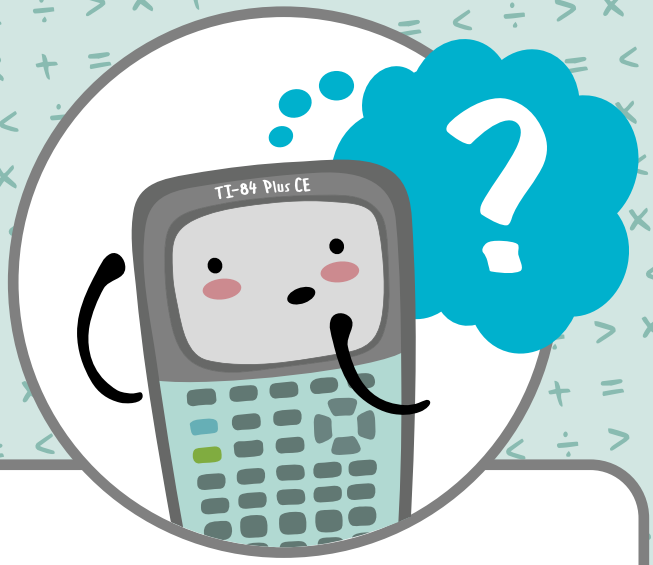
Y=-11
stat plot f1 tblset f2 format f3 calc f4 table f5
y=
window
zoom
trace
graph

7 A



Find the inverse of the function algebraically.

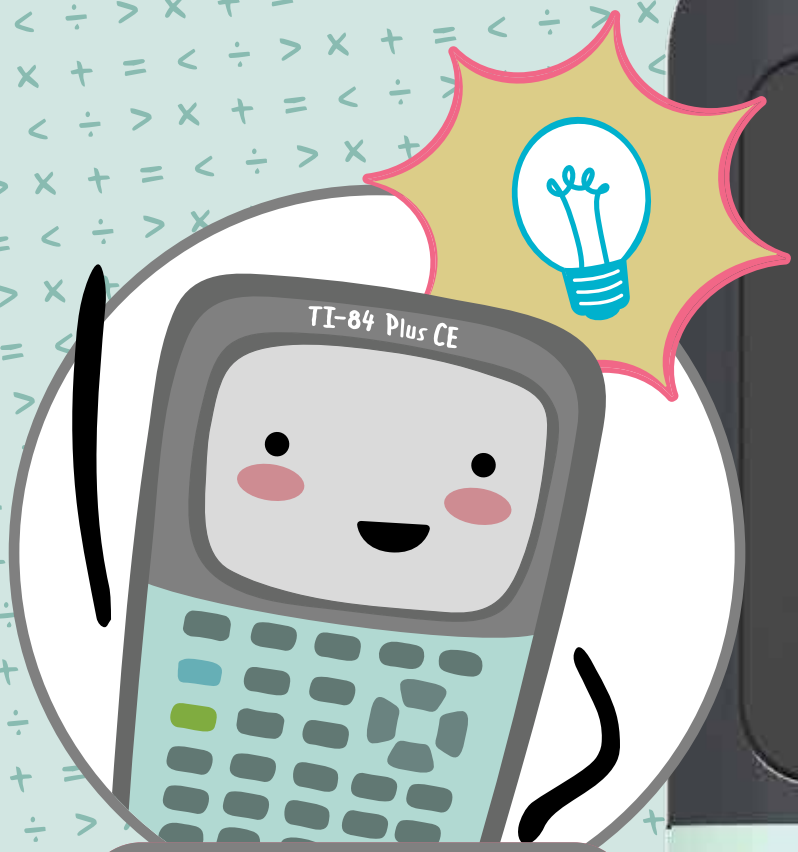
Then find the graph of the function and its inverse.

Evaluate:

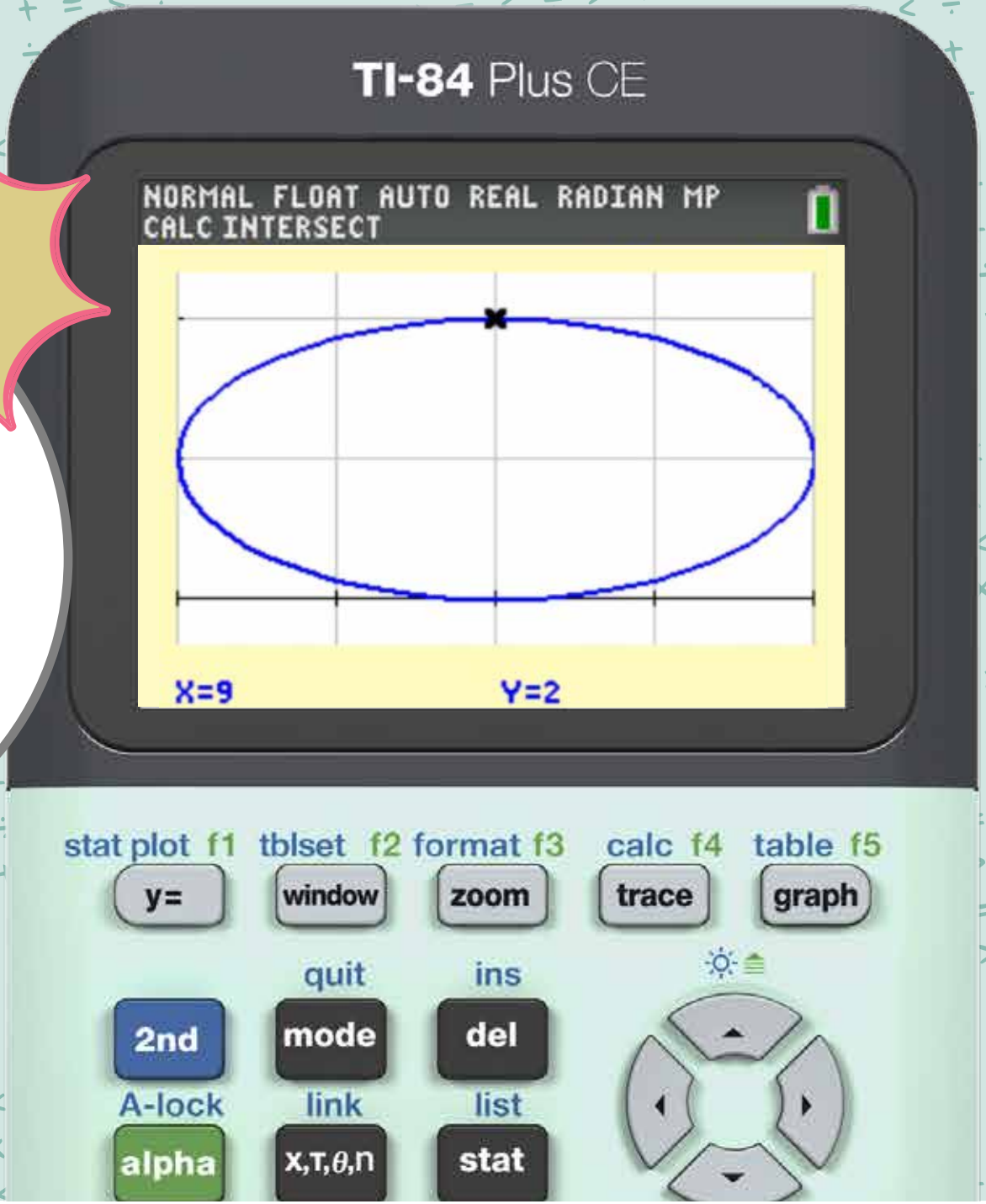
$f(x) =$

$$\sqrt[3]{6x + 4}$$

7 B


TI-84 Plus CE

Answer: B


TI-84 Plus CE
NORMAL FLOAT AUTO REAL RADIAN MP
CALC INTERSECT
X=9
Y=2
stat plot f1
tblset f2
format f3
calc f4
table f5
y=
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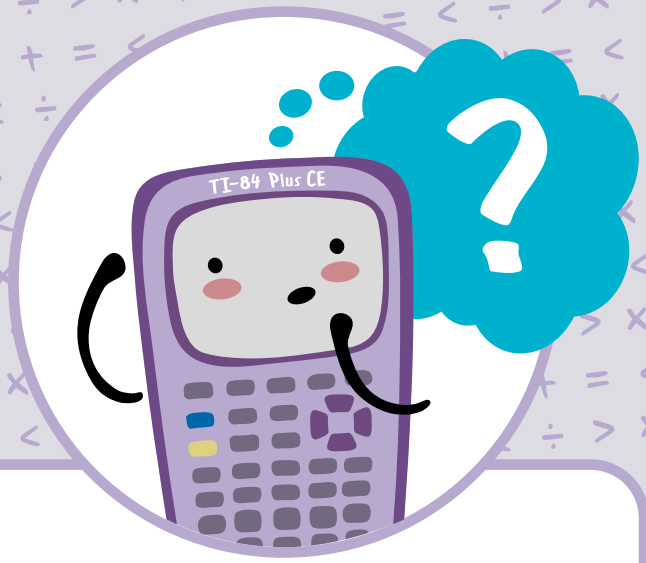
alpha
X,T,θ,n
stat

8 A



Write an equation of a sine function with an amplitude of 3 and a period of π.

Then, find the graph of the function.

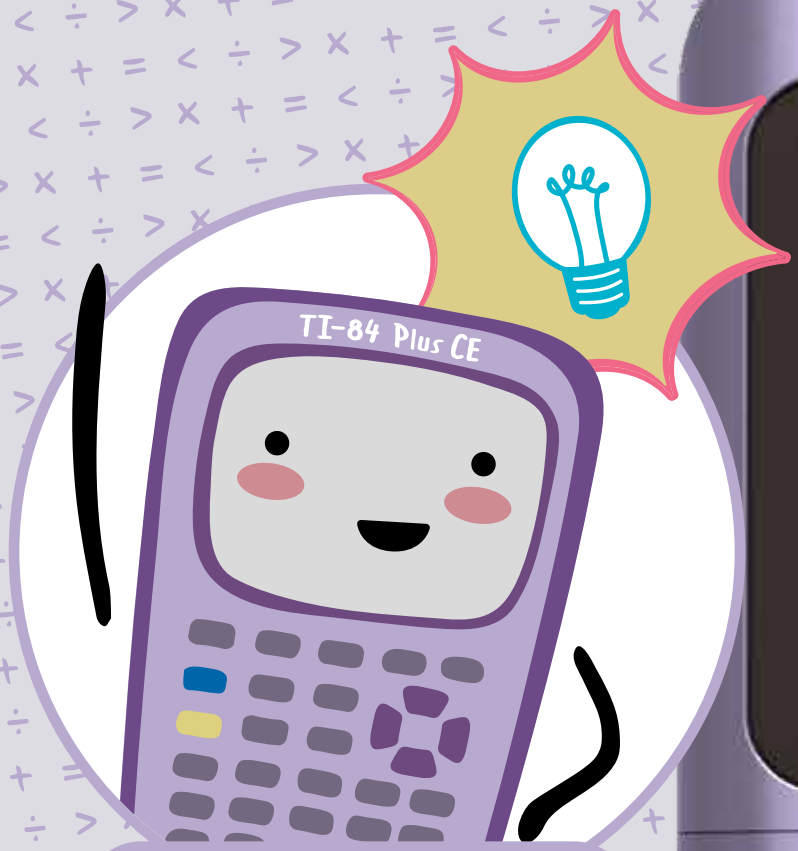
Evalulate:

sine function

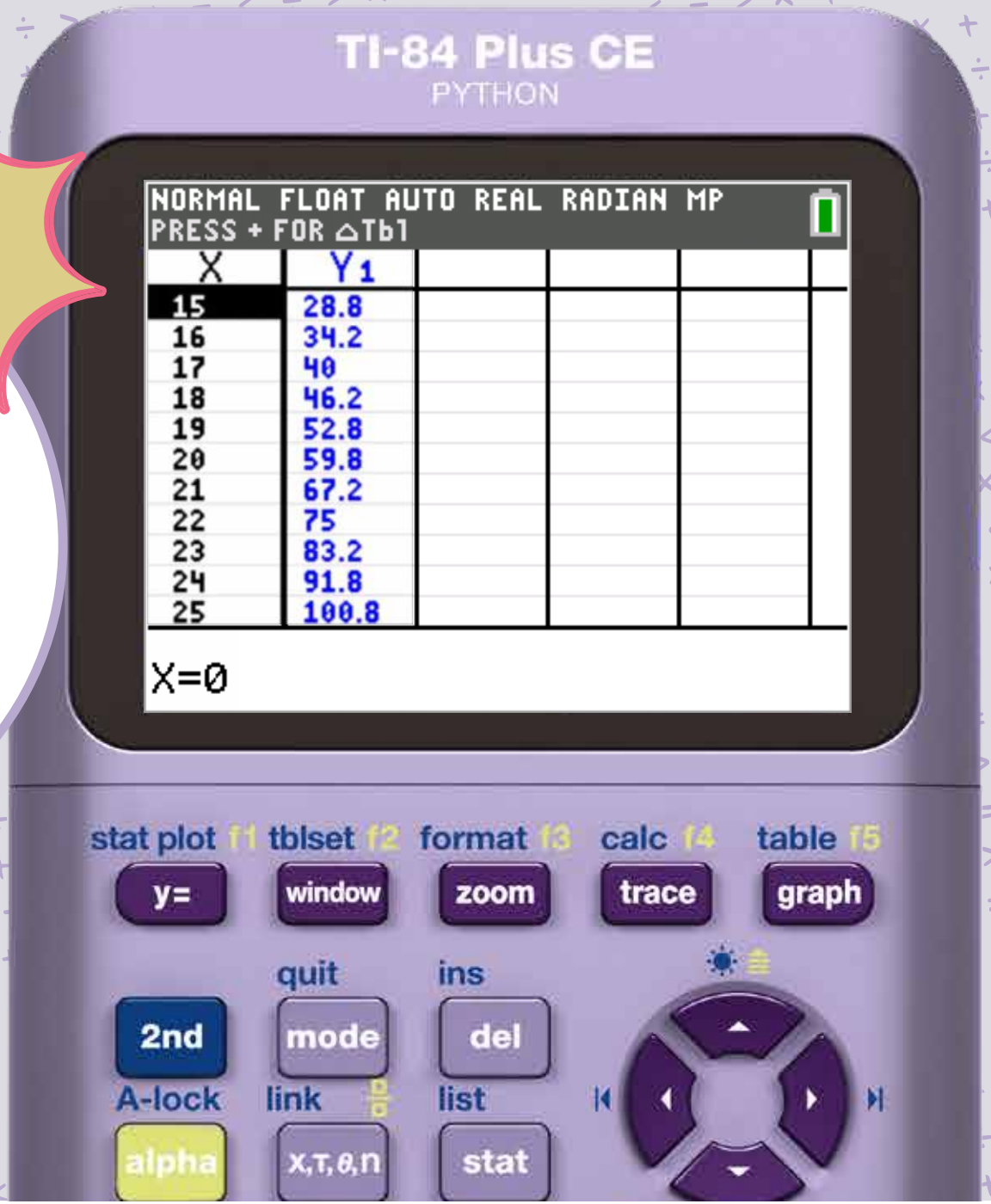
amplitude: 3

period: π

8 B


TI-84 Plus CE

Answer: M


TI-84 Plus CE
PYTHON
NORMAL FLOAT AUTO REAL RADIAN MP
PRESS + FOR △Tbl
X
Y1
15 28.8
16 34.2
17 40
18 46.2
19 52.8
20 59.8
21 67.2
22 75
23 83.2
24 91.8
25 100.8
X=0
stat plot f1
tblset f2
format f3
calc f4
table f5
y=
window
zoom
trace
graph
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ins
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mode
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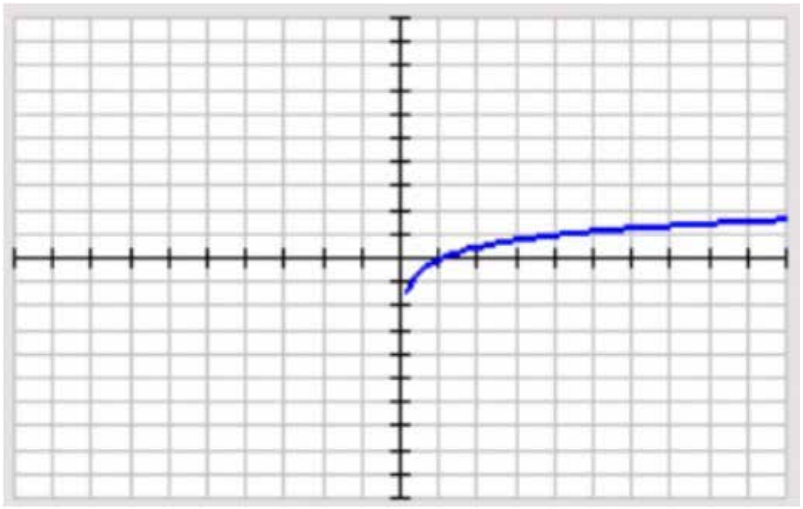
X,T,θ,n
stat

9 A

Use the graph of the logarithmic function.

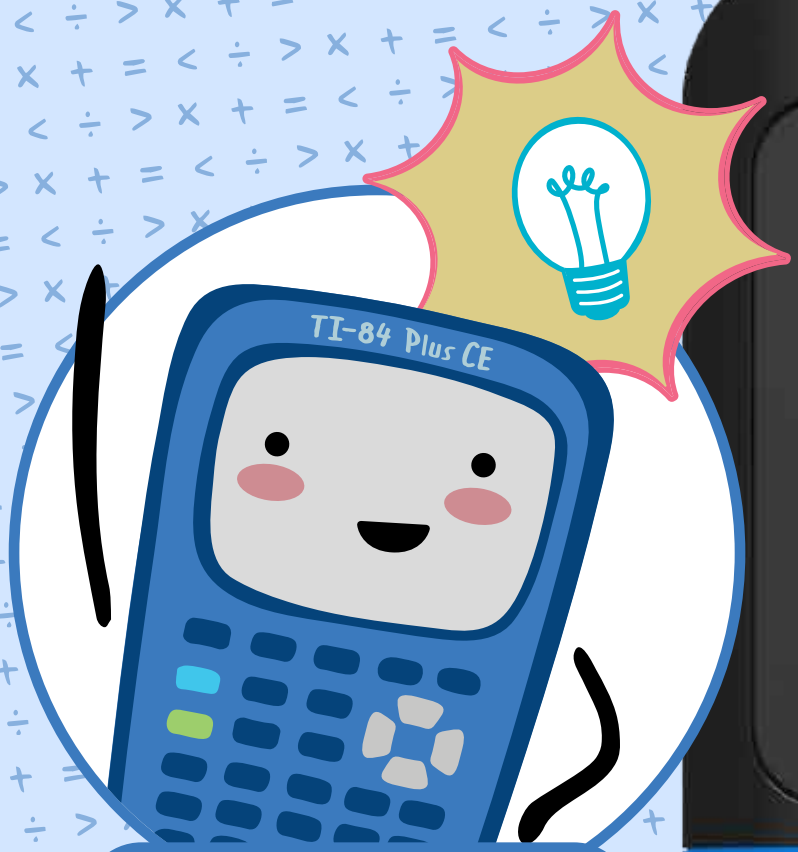
With this function, find the graph of the transformation:

$-f(x) + 3$

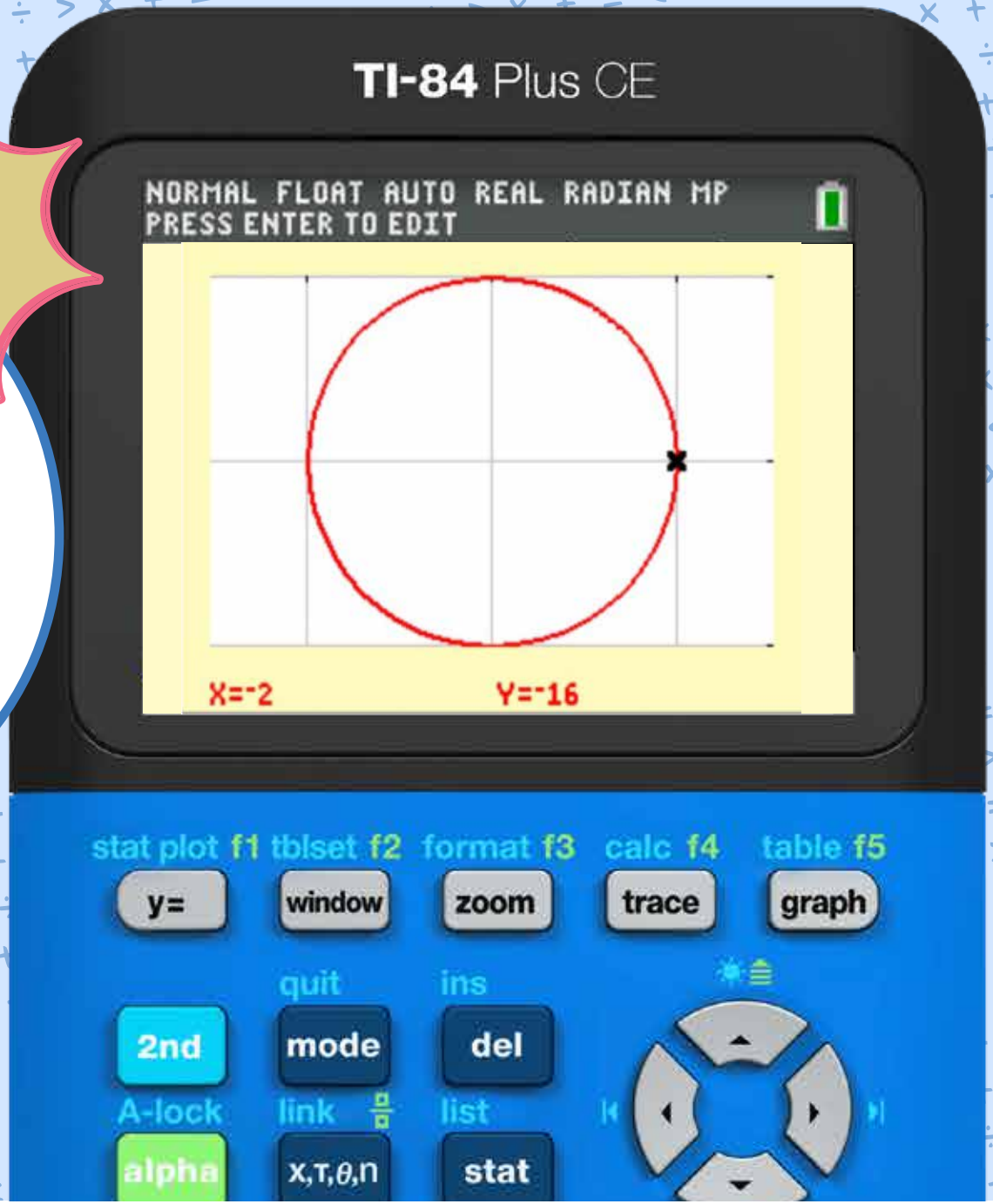


$y = log_4 x$

9 B


TI-84 Plus CE

Answer: G


TI-84 Plus CE
NORMAL FLOAT AUTO REAL RADIAN MP
PRESS ENTER TO EDIT
X=-2
Y=-16
stat plot f1 tblset f2 format f3 calc f4 table f5
y=
window
zoom
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list
alpha
X,T,θ,n
stat

10 A

Find the graph that shows:

$(f \circ g)(x)$

with the associated table that shows:

$(f \circ g)(-3)$

$(f \circ g)(2)$

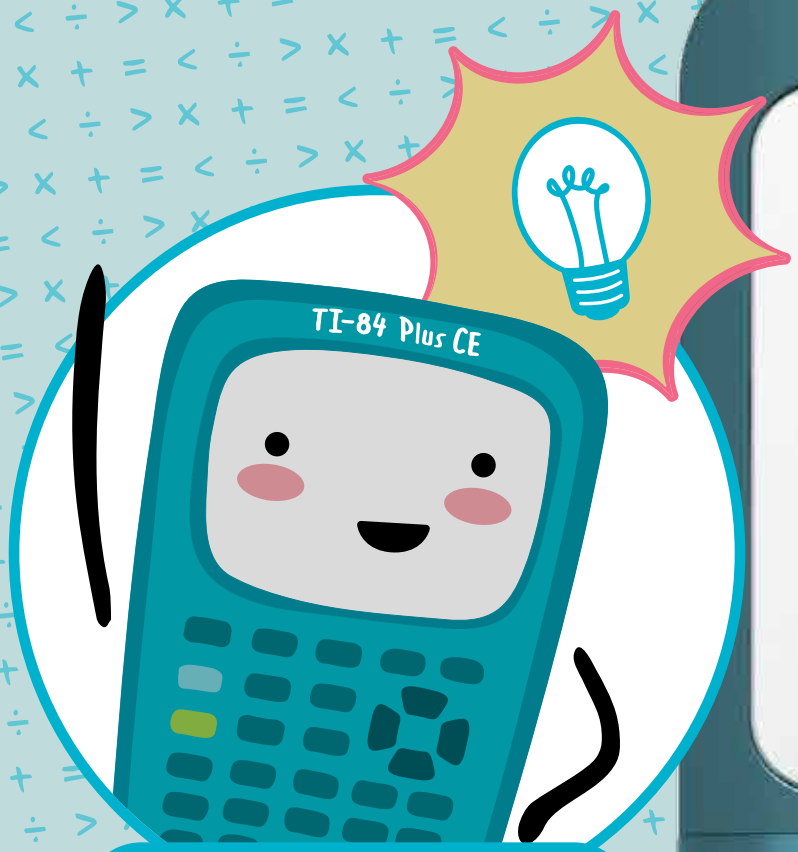
$(f \circ g)(7)$

Given:

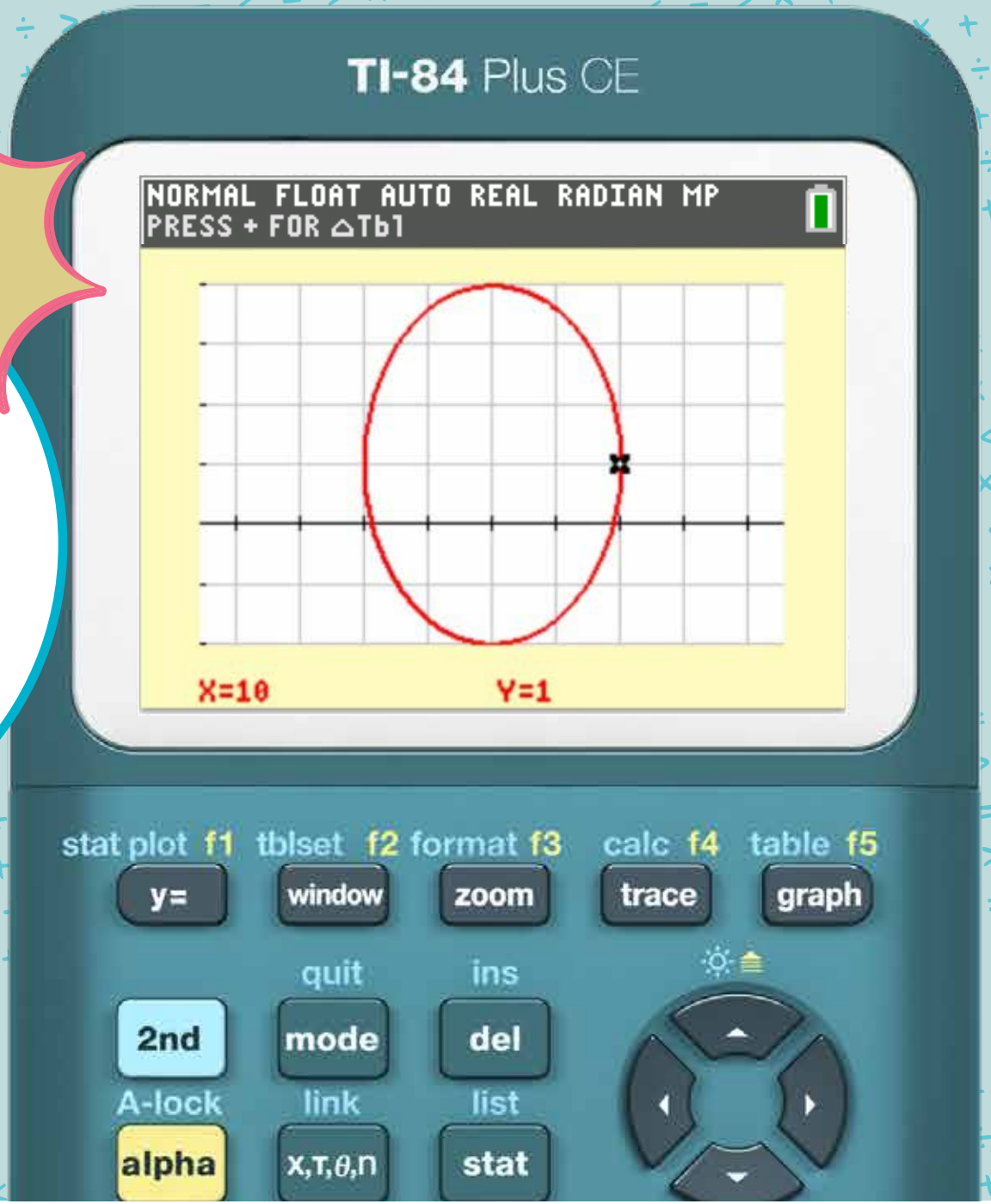
$f(x) = 4x^2 - 3$

$g(x) = x - 1$

10 B


TI-84 Plus CE

Answer: F


TI-84 Plus CE
NORMAL FLOAT AUTO REAL RADIAN MP
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X=10
Y=1
stat plot f1
tblset f2
format f3
calc f4
table f5
y=
window
zoom
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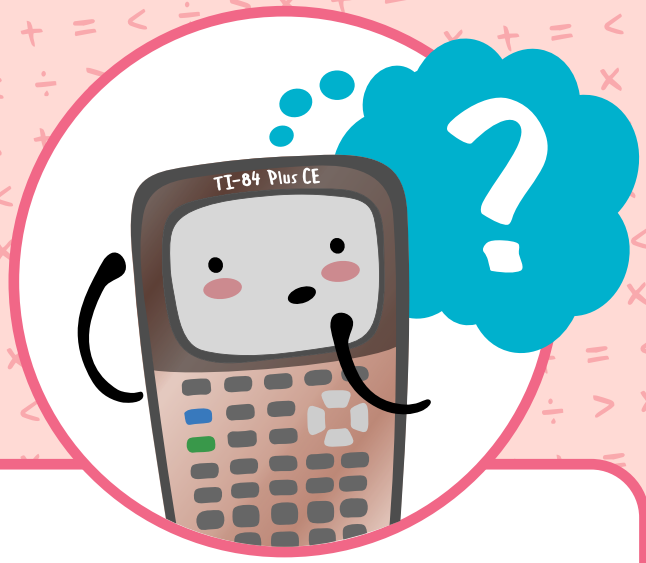
11 A



Write an equation of a sine function with an amplitude of 3 and a period of 4π.

Then, find the graph of the function.

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Evaluate:

sine function

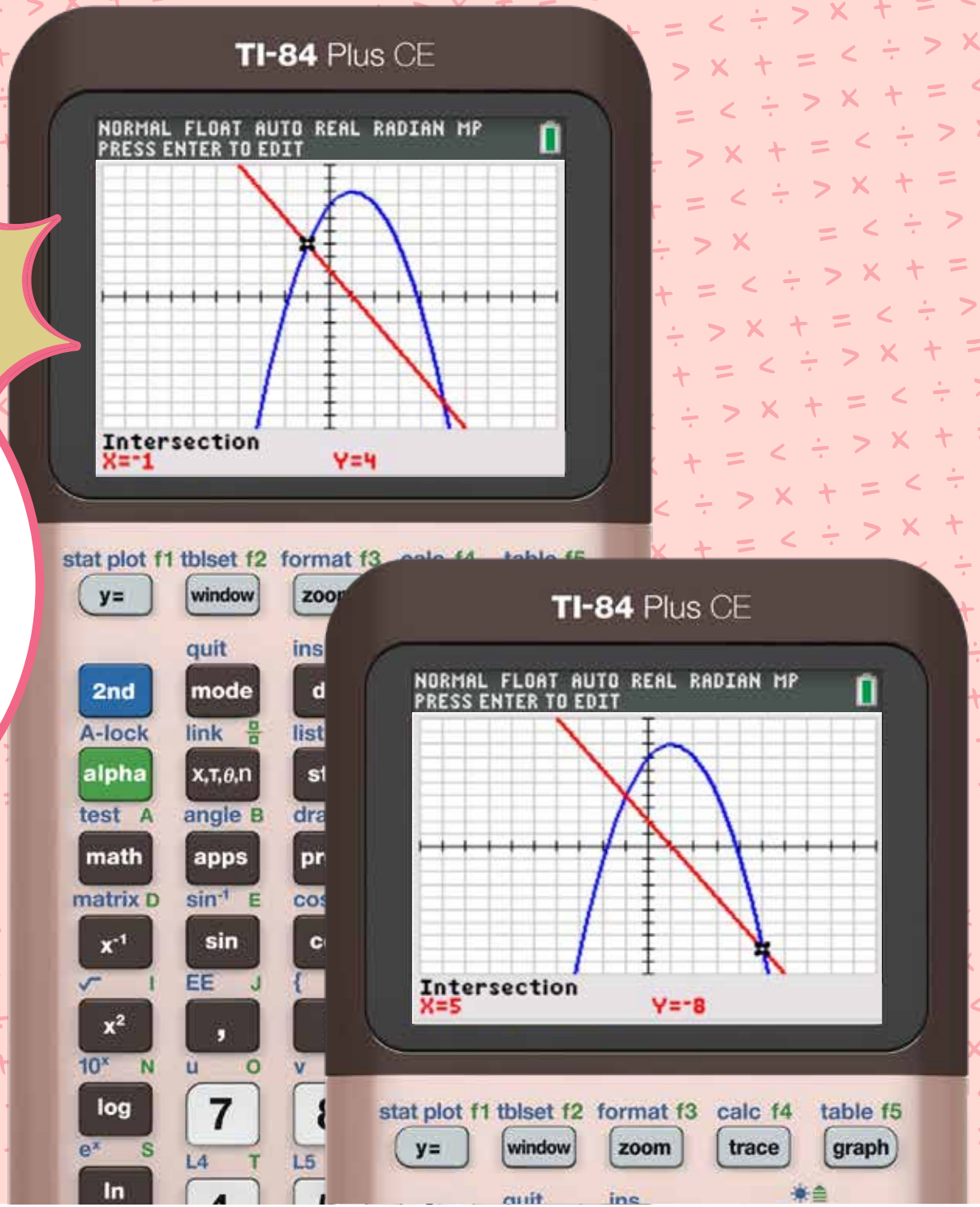
amplitude: 3

period: 4π

11 B


TI-84 Plus CE

Answer: P


TI-84 Plus CE
NORMAL FLOAT AUTO REAL RADIAN MP
PRESS ENTER TO EDIT
Intersection
X=-1
Y=4
stat plot f1 tblset f2 format f3
y=
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TI-84 Plus CE
NORMAL FLOAT AUTO REAL RADIAN MP
PRESS ENTER TO EDIT
Intersection
X=5
Y=-8
stat plot f1 tblset f2 format f3 calc f4 table f5
y=
window
zoom
trace
graph

12 A

Identify the type of conic section defined.

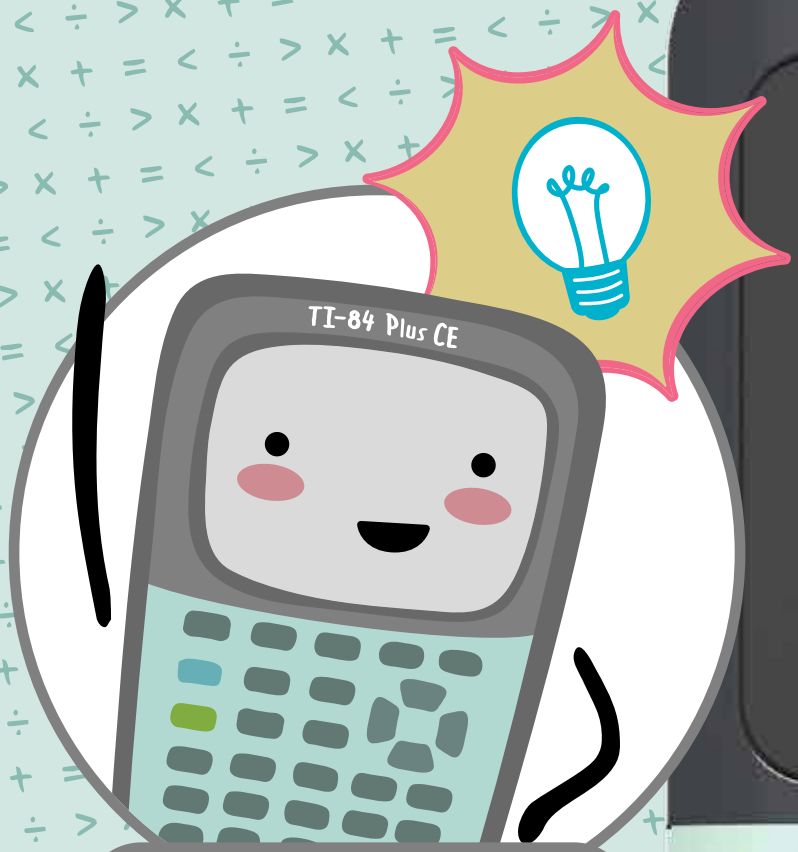
Rewrite the general form of the conic into standard form.

Then, find the associated graph.

Evaluate:

$x^2 + 4y^2 - 18x - 8y + 81 = 0$

12 B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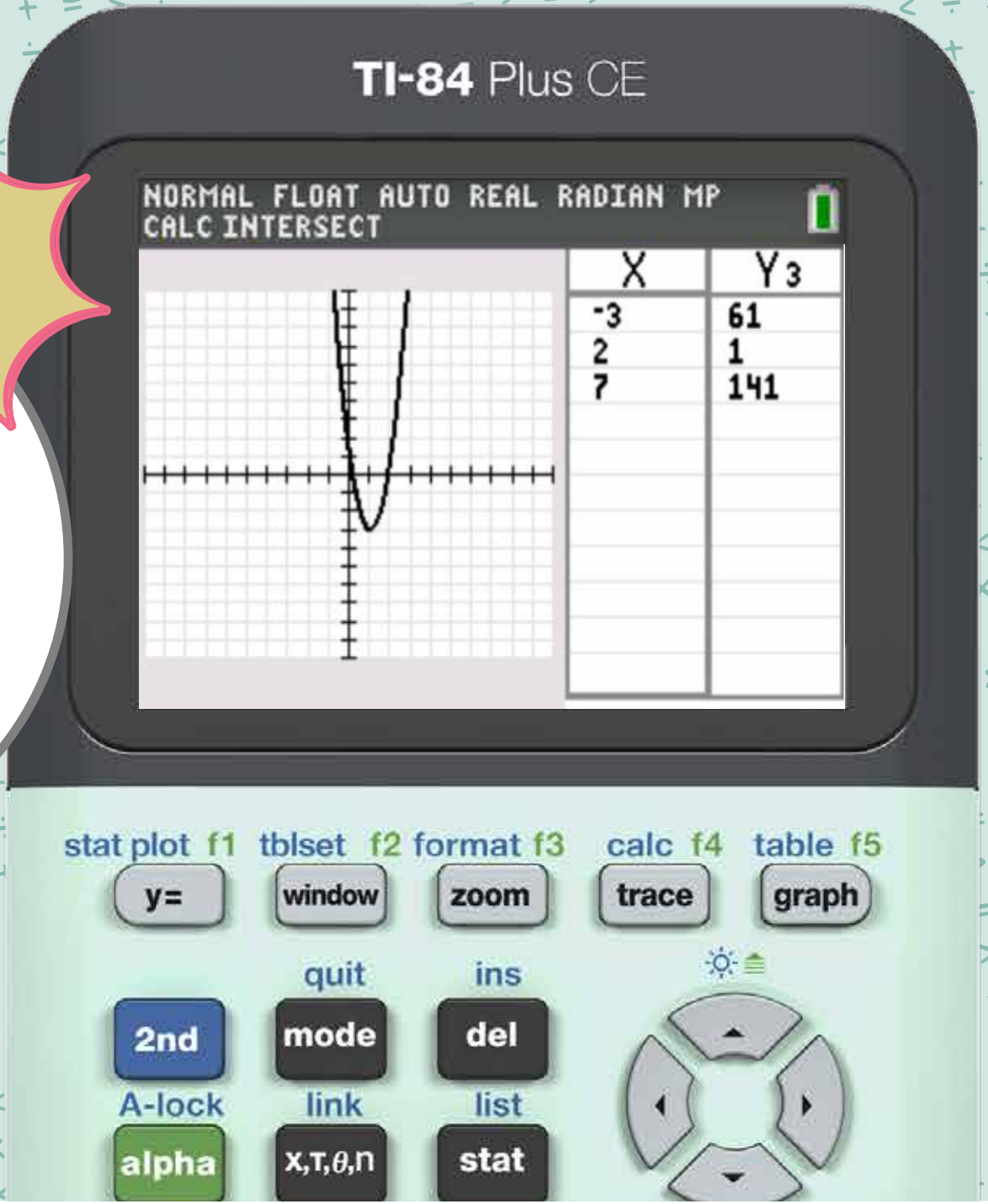
Answer: R


TI-84 Plus CE
NORMAL FLOAT AUTO REAL RADIAN MP
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Y3
-3
61
2
1
7
141
stat plot f1
tblset f2
format f3
calc f4
table f5
y=
window
zoom
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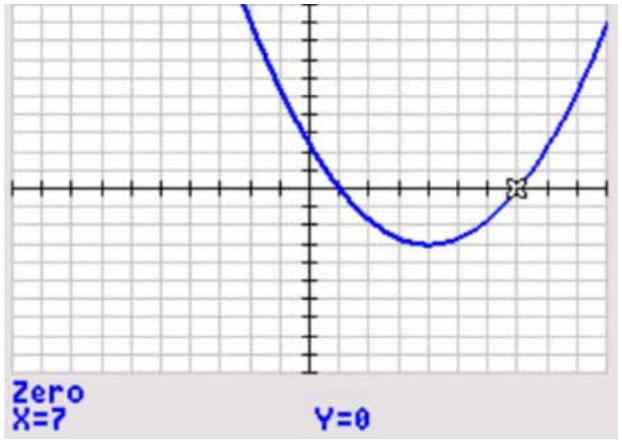
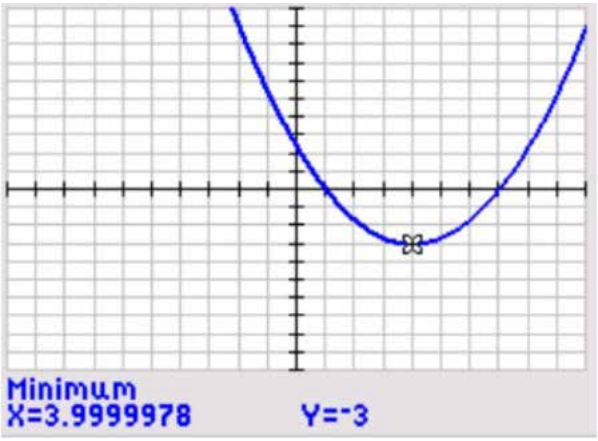
link
list
alpha
X,T,θ,n
stat

13 A

Look at the graphs of the parabola. They show the minimum and an x-intercept of the function. Write the equation for the parabola.

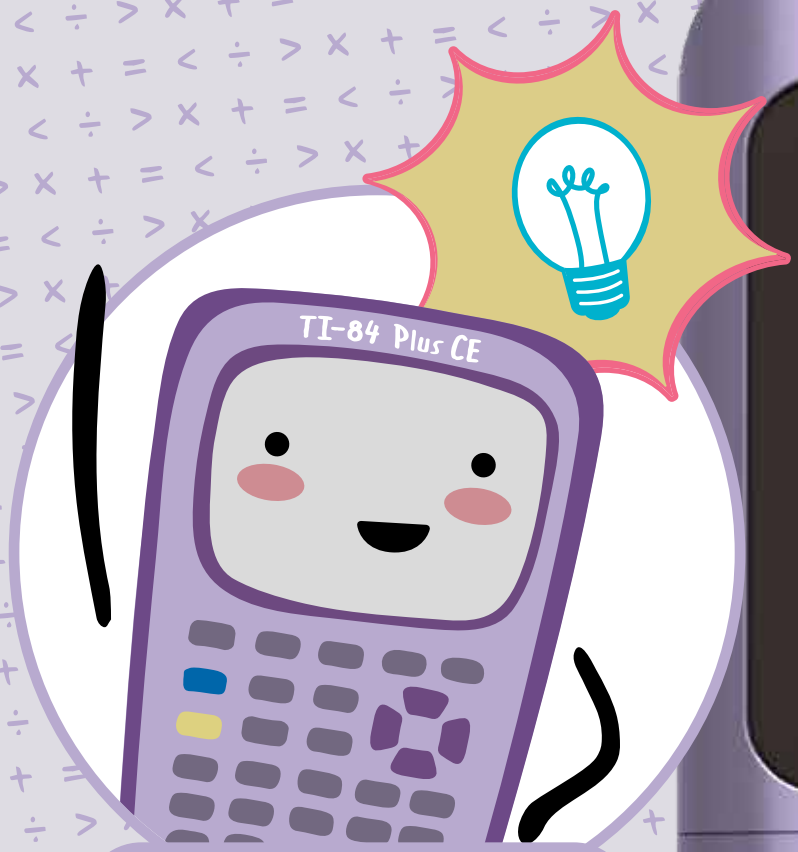
Then, use your equation to find the matching table of values.





Note: The minimum is (4,-3)

13 B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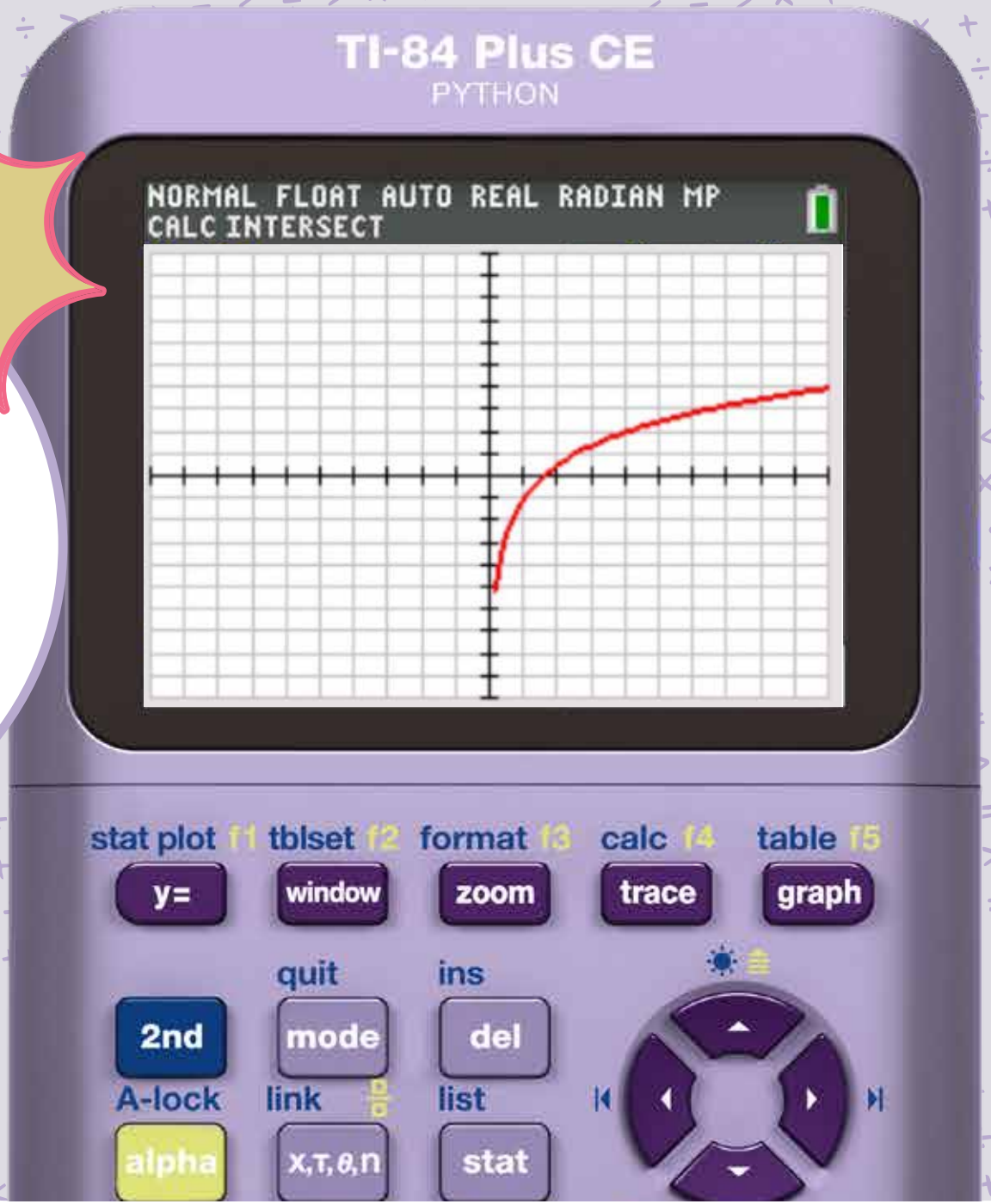
Answer:Q


TI-84 Plus CE
PYTHON
NORMAL FLOAT AUTO REAL RADIAN MP
CALC INTERSECT
stat plot f1
tblset f2
format f3
calc f4
table f5
y=
window
zoom
trace
graph
quit
ins
2nd
mode
del
A-lock
link
list
alpha
X,T,θ,n
stat

14 A

Identify the type of conic section defined.

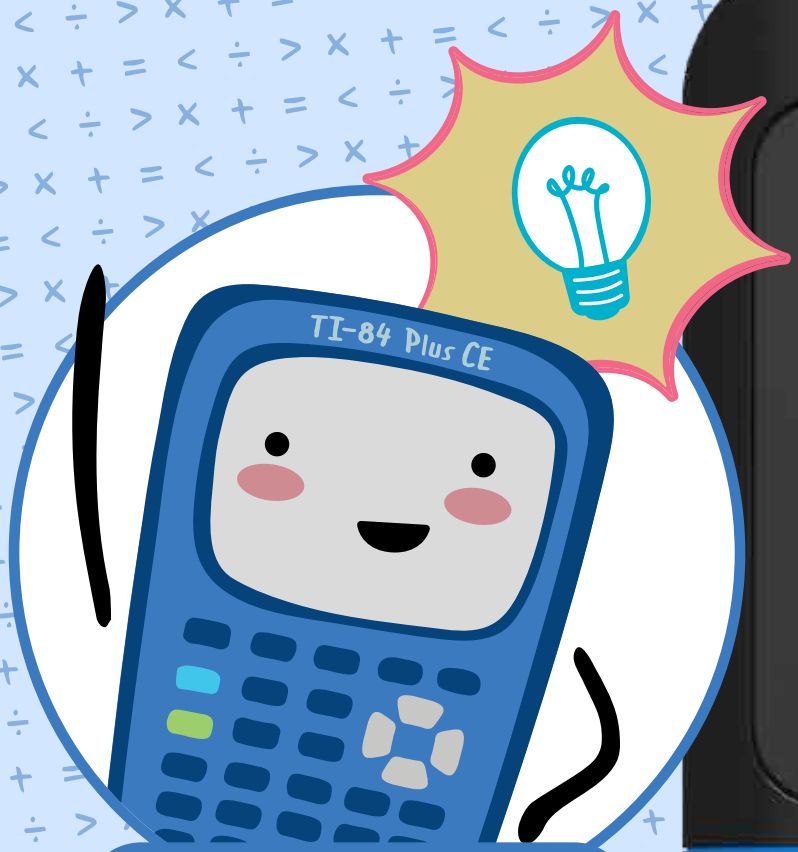
Rewrite the general form of the conic into standard form.

Then, find the associated graph.

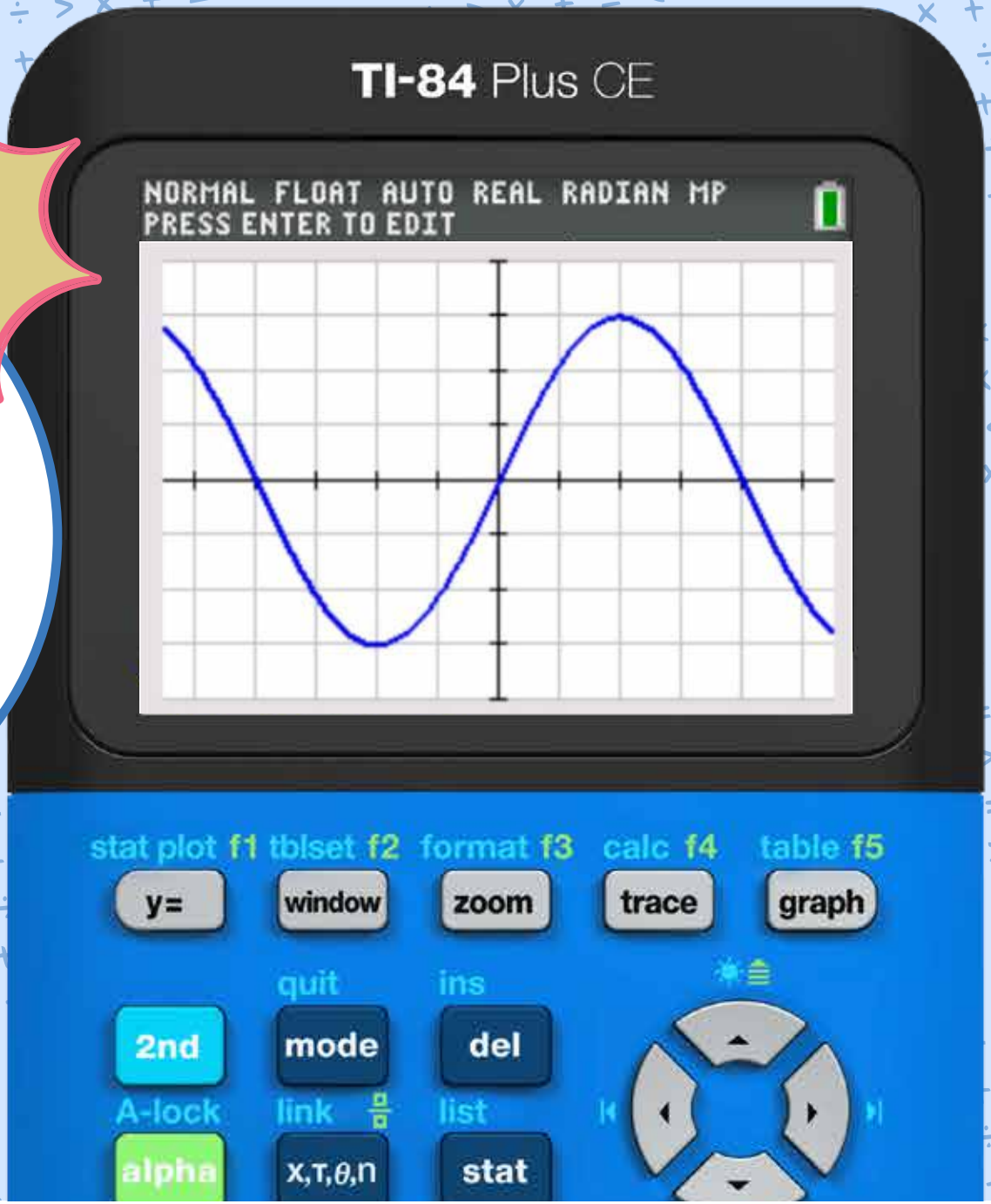
Evaluate:

$x^2 + y^2 + 24x + 10y + 160 = 0$

14 B


TI-84 Plus CE

Answer: L


TI-84 Plus CE
NORMAL FLOAT AUTO REAL RADIAN MP
PRESS ENTER TO EDIT
stat plot f1 tblset f2 format f3 calc f4 table f5
y=
window
zoom
trace
graph
quit
ins
2nd
mode
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A-lock
link
list
alpha
X,T,θ,n
stat

15 A

Find the solution for the system of equations algebraically.

Then check your solution by finding the graphical solution

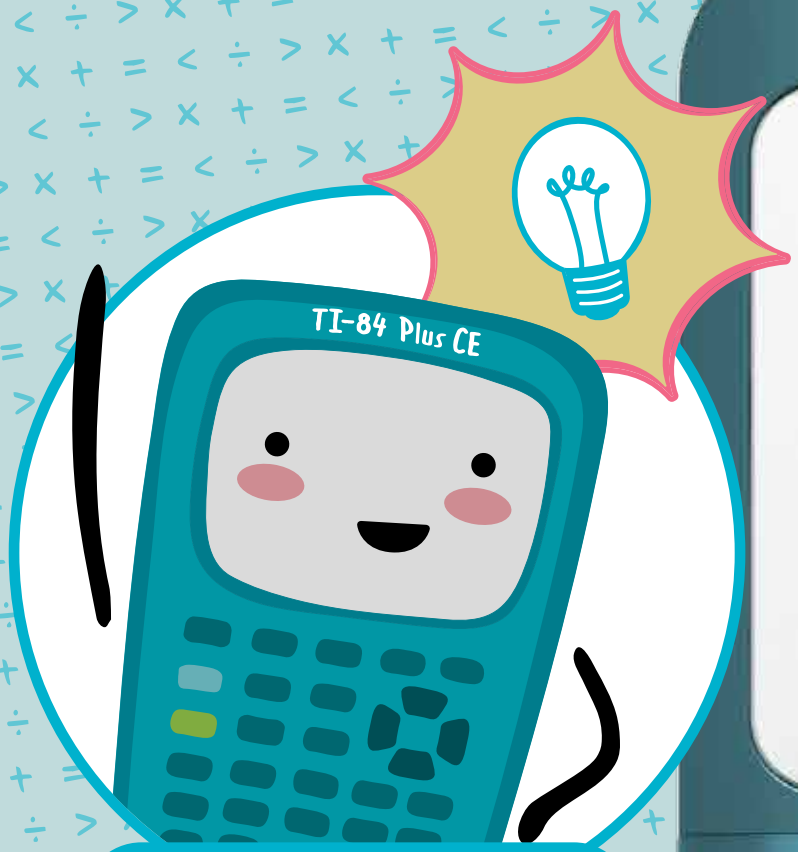
.

Evaluate:

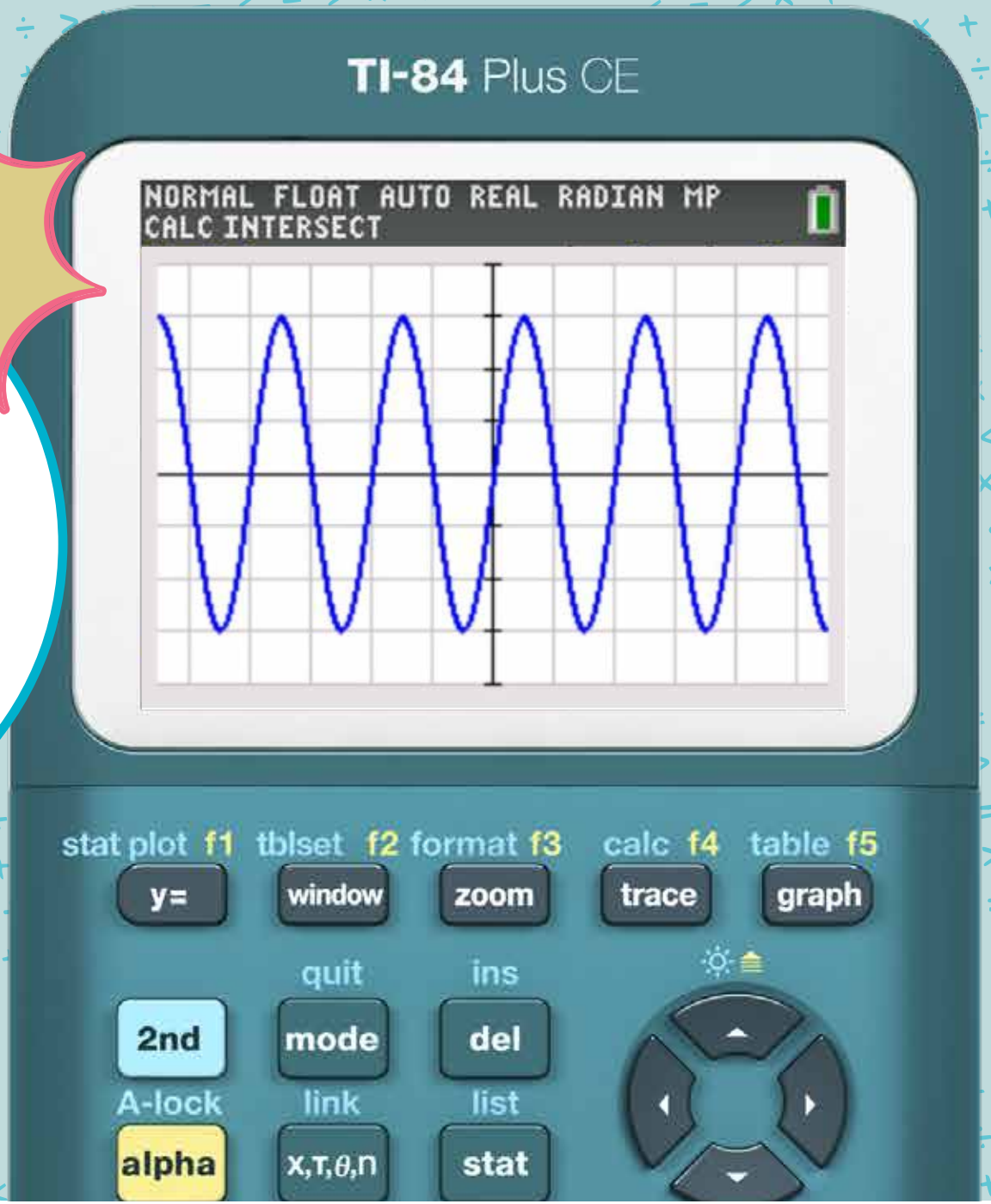
$$y = -x^2 - 4x + 1$$

$$y = -2x + 1$$

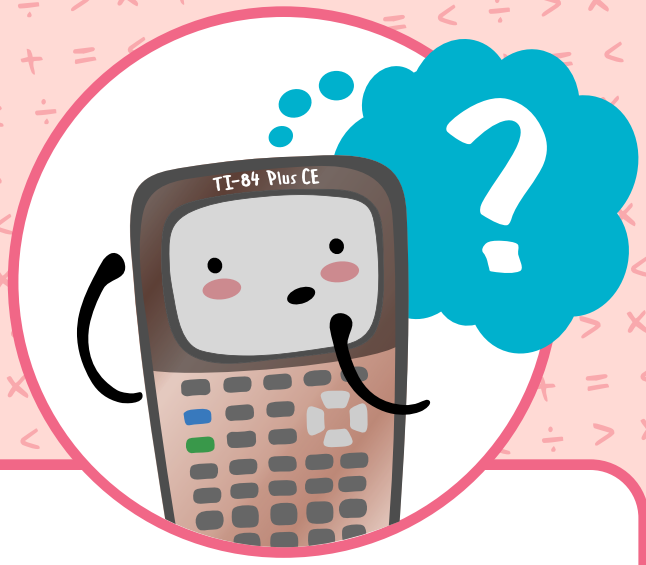
15 B


TI-84 Plus CE

Answer: A

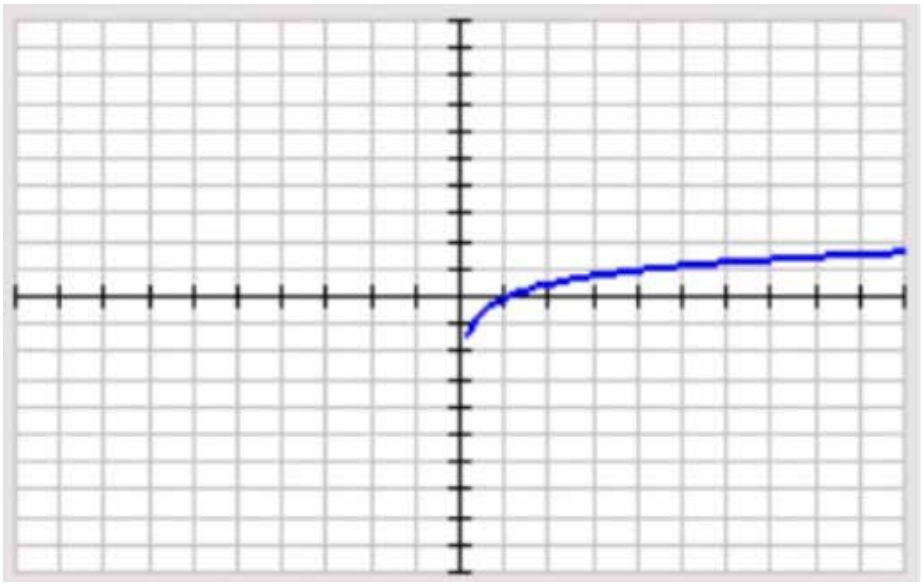

TI-84 Plus CE
NORMAL FLOAT AUTO REAL RADIAN MP
CALC INTERSECT
stat plot f1
tblset f2
format f3
calc f4
table f5
y=
window
zoom
trace
graph
quit
ins
2nd
mode
del
A-lock
link
list
alpha
X,T,θ,n
stat

16 A

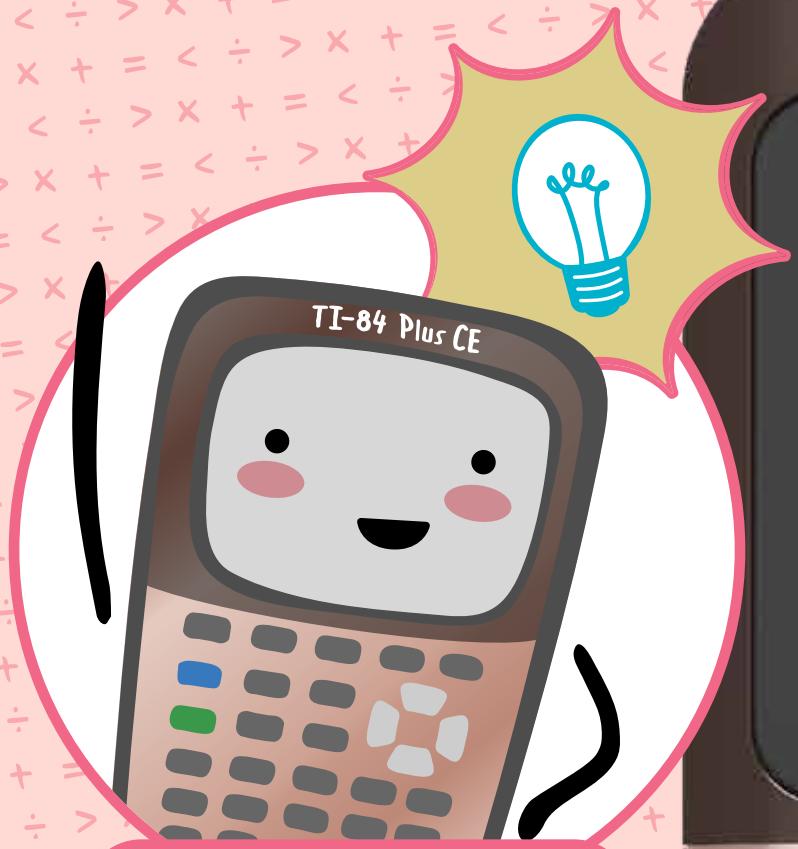


Use the logarithmic function graph to find the graph of the transformation:

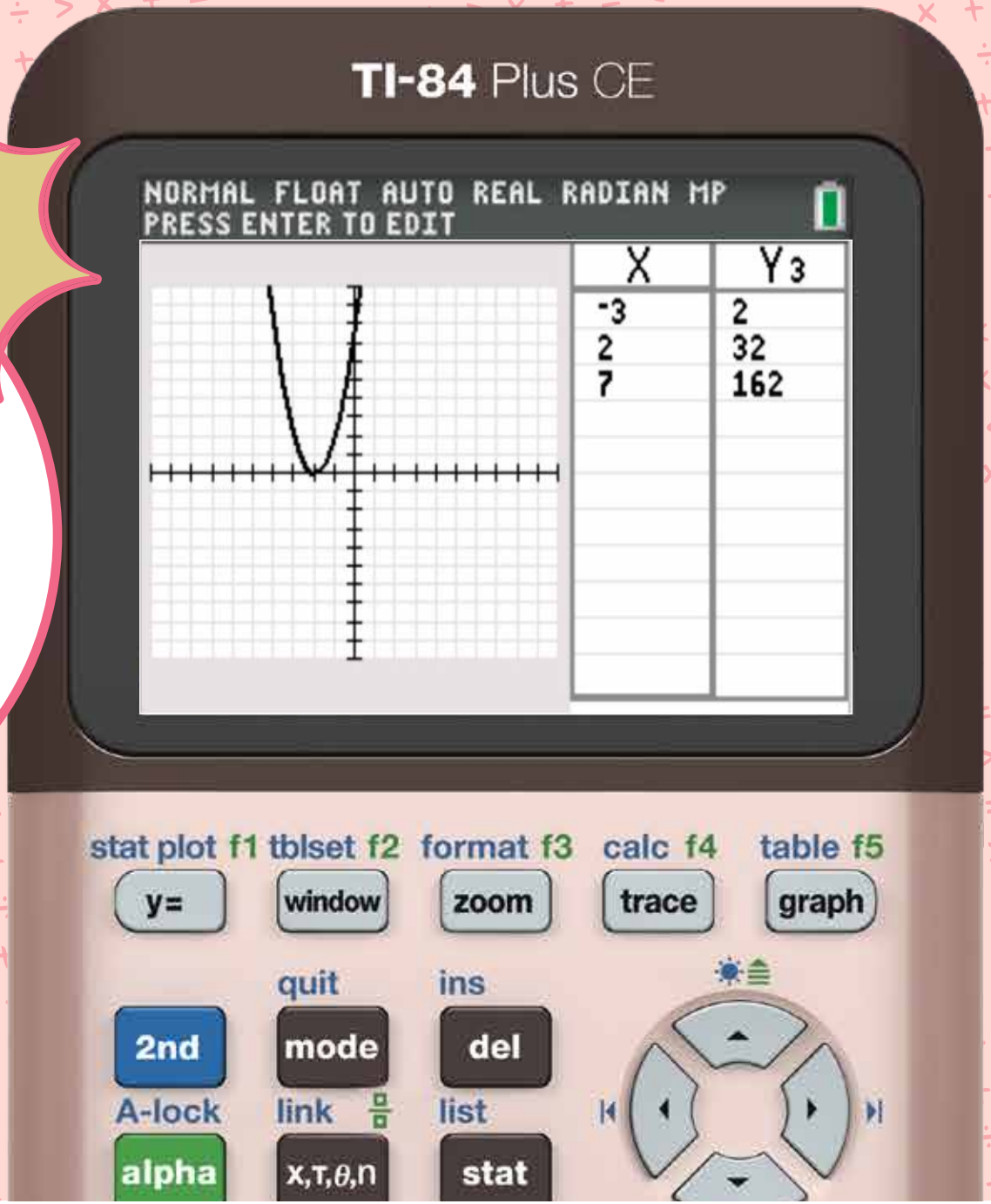
$3f(x) - 1$



16 B


TI-84 Plus CE

Answer: O


TI-84 Plus CE
NORMAL FLOAT AUTO REAL RADIAN MP
PRESS ENTER TO EDIT
X
Y3
-3
2
7
2
32
162
stat plot f1
tblset f2
format f3
calc f4
table f5
y=
window
zoom
trace
graph
quit
ins
2nd
mode
del
A-lock
link
list
alpha
X,T,θ,n
stat

17 A

Identify the type of conic section defined.

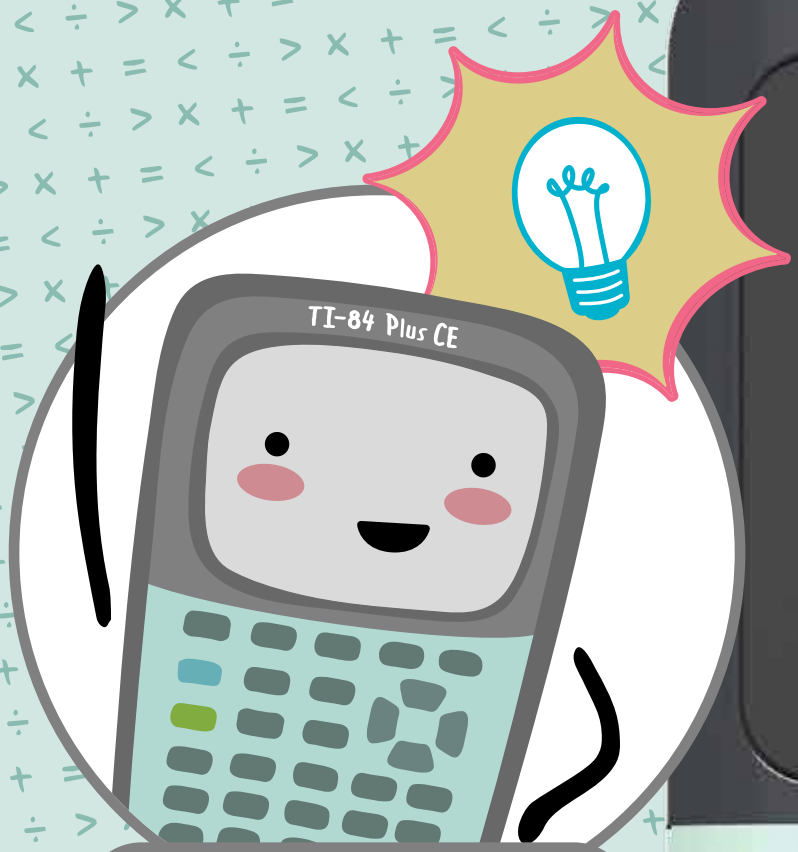
Rewrite the general form of the conic into standard form.

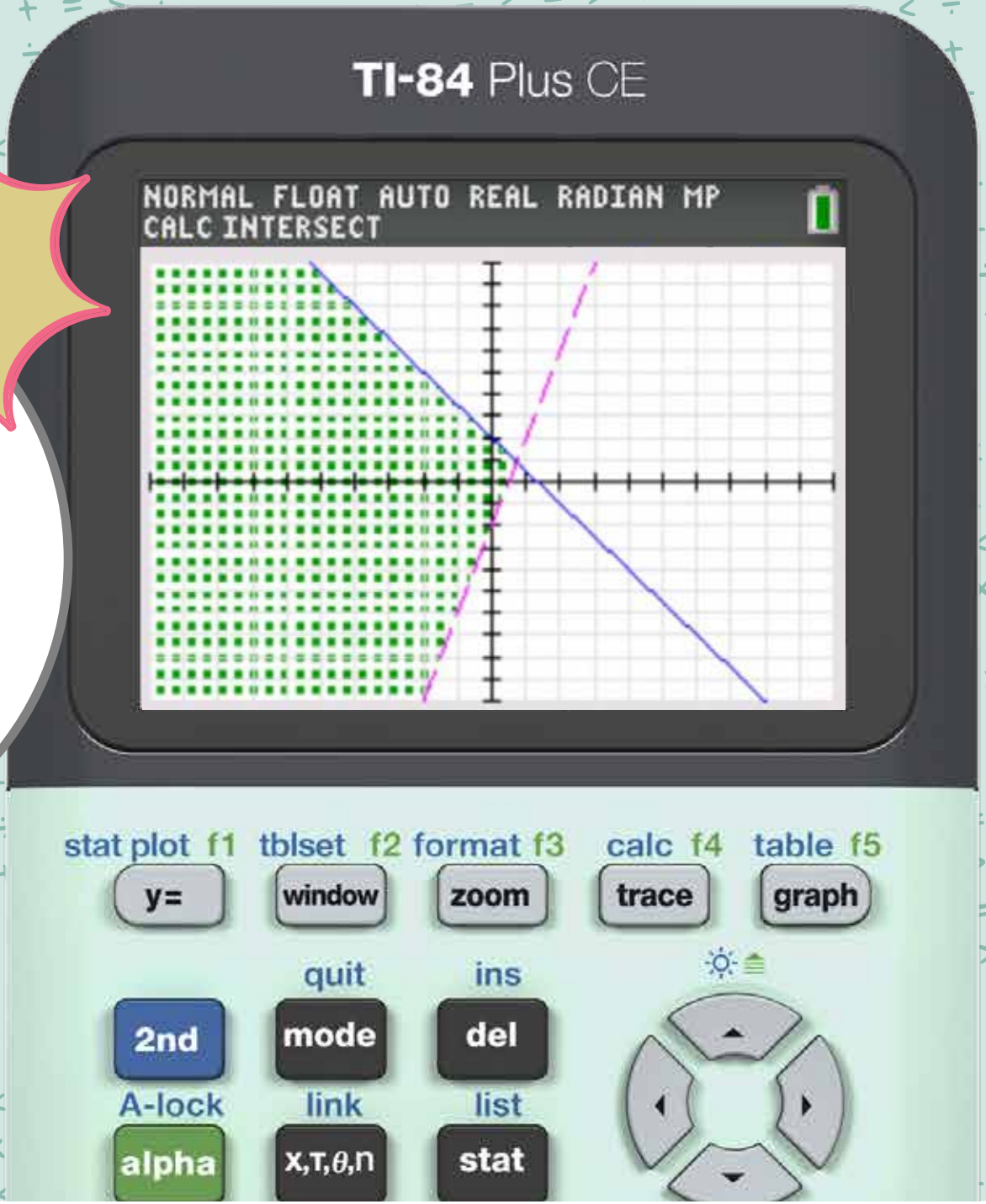
Then, find the associated graph.

Evaluate:

$9x^2 + 4y^2 - 144x - 8y + 544 = 0$

17 B


TI-84 Plus CE


TI-84 Plus CE
NORMAL FLOAT AUTO REAL RADIAN MP
CALC INTERSECT
stat plot f1
tblset f2
format f3
calc f4
table f5
y=
window
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trace
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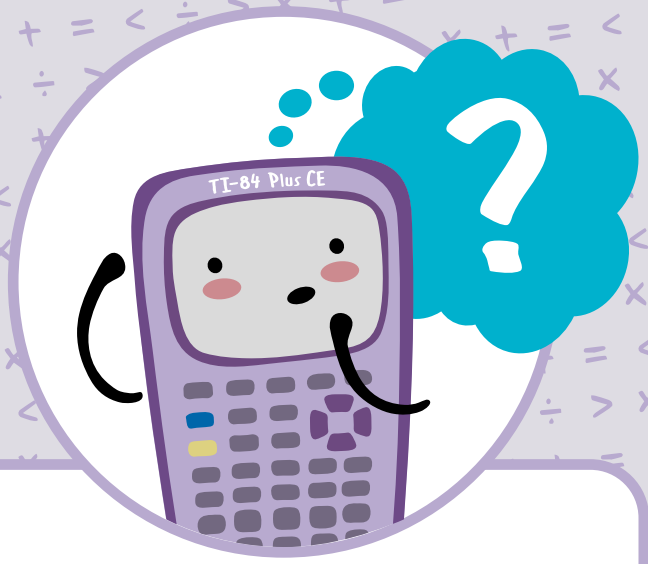
X,T,θ,n
stat

Answer: H

18 A



Identify the type of conic section defined.

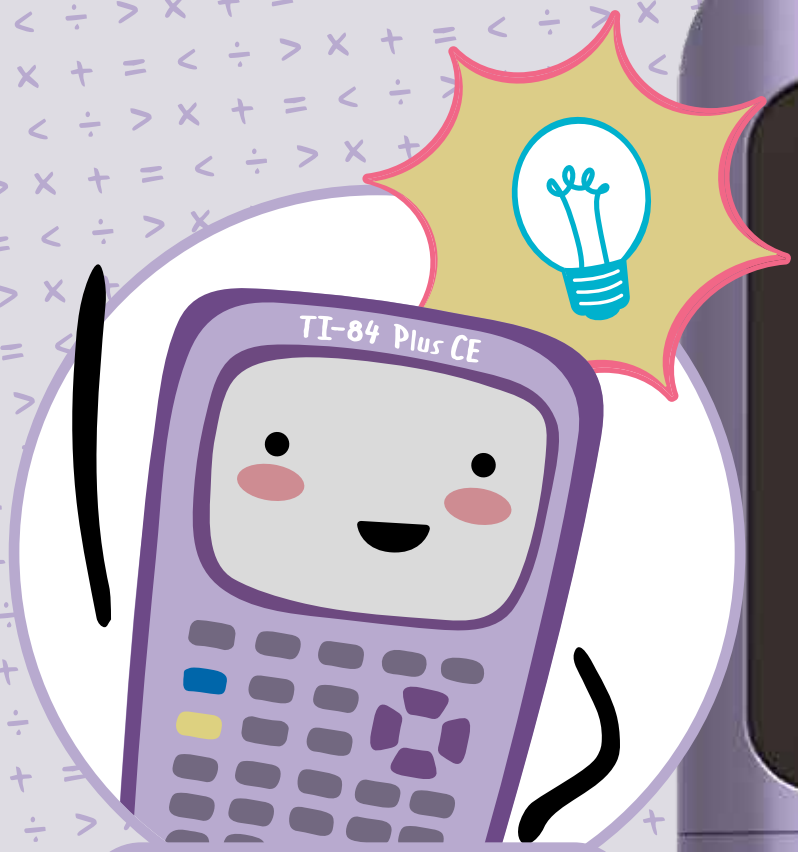
Rewrite the general form of the conic into standard form.

Then, find the associated graph.

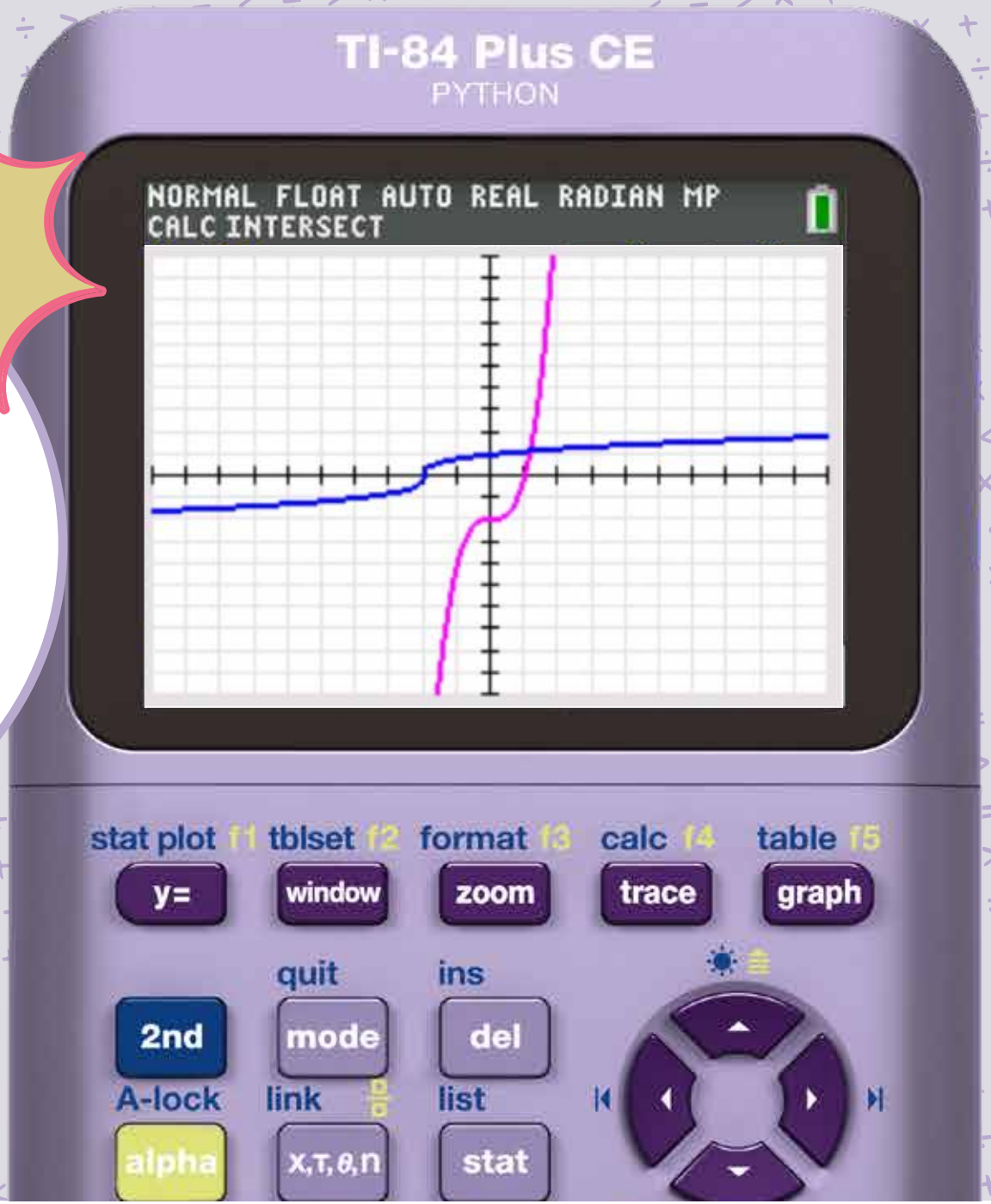
Evaluate:

$x^2 + y^2 + 6x + 32y + 264 = 0$

18 B


TI-84 Plus CE

Answer: C


TI-84 Plus CE
PYTHON
NORMAL FLOAT AUTO REAL RADIAN MP
CALC INTERSECT
stat plot f1
tblset f2
format f3
calc f4
table f5
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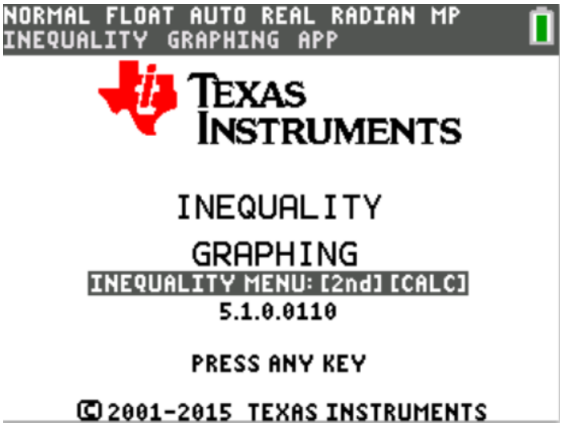
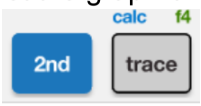
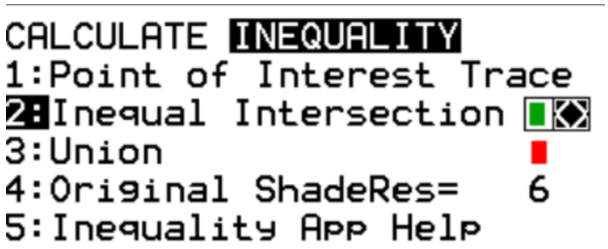
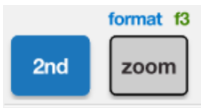
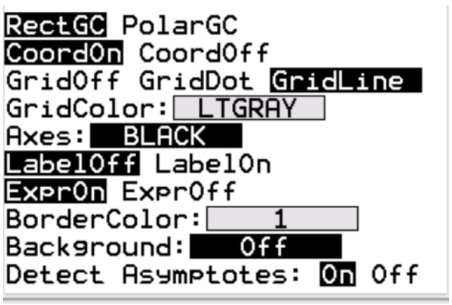
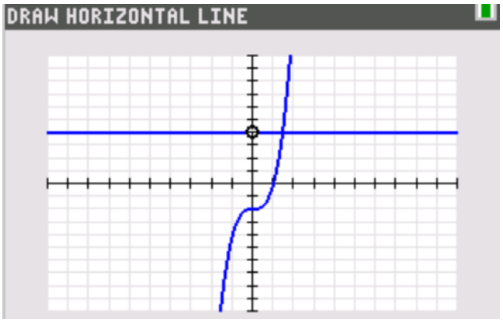
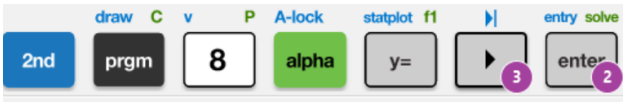
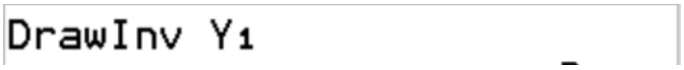
X,T,θ,n
stat

Precalculus Scavenger Hunt

Part 2: Teacher Answer/Hint Sheet

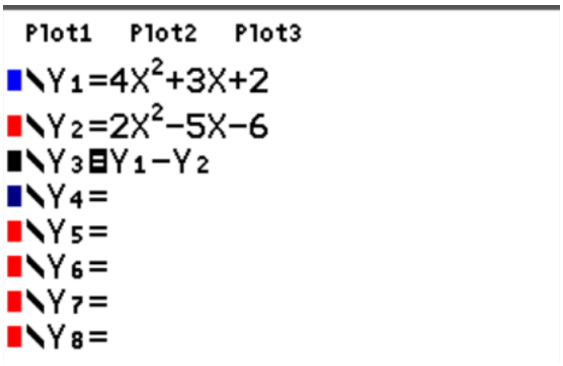
Question	Answer	Hints/Key Presses/Discussion
1	J	Students are asked to graph a system of inequalities, and should specifically to be able to graph only the solution (intersection) on their calculators. Students will need to rewrite the inequalities into slope-intercept form to be graphed: $y < \frac{3}{2}x - 2$ $y \leq -\frac{3}{4}x + 5$ To graph inequalities, ensure that the Inequality App is running.   In the  menu, In the first $y =$ field, scroll over so that you are highlighting $y =$, and press enter. You will get an options menu: 

		Scroll down to Y, and scroll to the appropriate inequality symbol, then scroll to OK and press enter. This can be repeated for multiple inequalities. Type in your inequalities, and then press GRAPH. In order to see just the graph of the intersection, go to the Calculate menu  , and scroll right to the INEQUALITY menu:  In Option 2 (Inequal Intersection), scroll to pick which color you prefer, then PRESS ENTER!
2	**C**	Students are given a function and asked to find the inverse function. On their answer sheets, they are asked if the original function is one-to-one. That notion can be checked with the Horizontal Line Test, and then they are asked to find the inverse algebraically before finding the graph of the inverse in the scavenger hunt. $f(x) = 2x^3 - 2$ $f^{-1}(x) = \sqrt[3]{\frac{x+2}{2}}$ Hint: For students that need a visual with the HLT, two quick options a. Make sure that their gridlines are turned on. (The gridlines can help students see horizontal lines through a function.) In the FORMAT menu:  

		b. Using the DRAW menu, you can turn on a horizontal line that you can scroll up and down for a visual aid. Graph the original function, then   Students are then tasked with finding the graph with the original function and inverse function. Using their calculators, there are a couple of ways to check an inverse. a. After finding the inverse algebraically, students can graph each individually in Y_1 and Y_2. (They may also want to graph $y = x$ to show symmetry about the origin.) b. Again, using the DRAW menu, the TI-84 can actually draw the inverse of any function. Enter the original function in Y_1, then go to the DRAW menu, and choose DrawInv. You then must define which function for which you want to graph the inverse, using a functions list (either in the variables menu or the f1 shortcuts.)  OR  
3	**O**	Students are asked to find $(f - g)(x)$ given two functions. Then, they are tasked with finding the graph of the difference along with a table of 3 particular function values.

Some hints/shortcuts:

Instead of finding the difference by hand, students can type $f(x)$ and $g(x)$ into Y_1 and Y_2, respectively, and then use one of the function menus to simply type the difference into Y_3. (For how to find the function menus, see hints in #2).



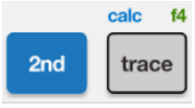
Students can choose to turn the original functions off in order to focus on the difference.

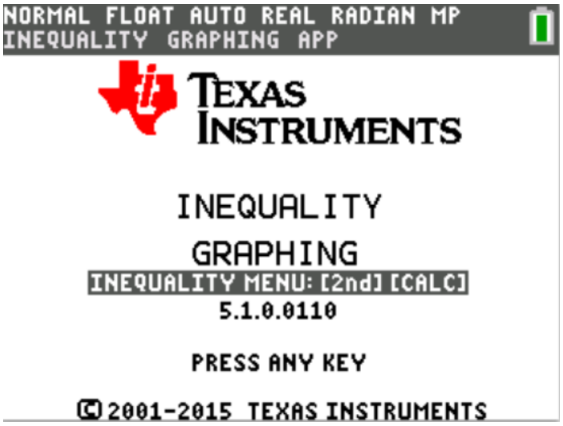
To change the table settings, so that a specific function value or values can be displayed:

(2nd – Tblset – Scroll Down to Independent – Select Ask)

To view the graph and table in the same window:

Press MODE, then choose the GRAPH-TABLE option.

4	**M**	Students are given two graphs of the same quadratic function. One gives the minimum and one gives a zero. (Both can be found by using the calculator. After entering your function into the $y =$ menu and graphing it, use the calculate menu  to access both the "zero" and "minimum" functions. Both will ask for a left and right bound, then a guess, before providing the answer.) Hint: It would probably be wise for students to use the minimum and the zero to write the equation of the parabola in VERTEX FORM. $(y = a(x - h)^2 + k)$ The correct answer is $y = \frac{1}{5}(x - 2)^2 - 5$ Then, students must use their equation to find the appropriate table of values for the function.
5	**P**	Students are asked to solve a system of equations involving a quadratic and a linear function. Students are asked to solve algebraically, but then check their work by finding the graphical solution. Once both equations are entered into the $y =$ menu, students can calculate both intersection points by going to the Calculate menu:  Then, select 5:intersect. The calculator will ask for the student to identify the first curve, the second curve, and then a guess for the intersection point before giving a solution. As this system has two real solutions, students will need to repeat this process to find the second solution.
6	**H**	Students are asked to graph a system of inequalities, and should specifically to be able to graph only the solution (intersection) on their calculators. Students will need to rewrite the inequalities into slope-intercept form to be graphed: $y \leq -\frac{3}{2}x + 2$ $y > 4x - 2$ To graph inequalities, ensure that the Inequality App is running. 

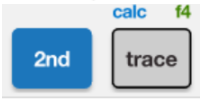


In the 

menu,

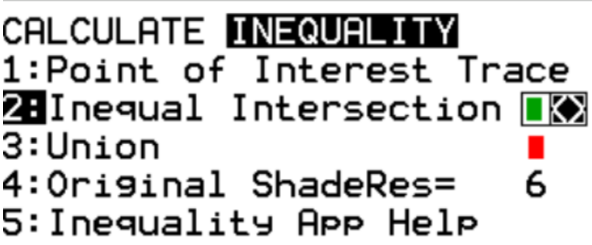
In the first $y =$ field, scroll over so that you are highlighting $y =$, and press enter. You will get an options menu:

Scroll down to Y1, and scroll to the appropriate inequality symbol, then scroll to OK and press enter. This can be repeated for multiple inequalities. Type in your inequalities, and then press GRAPH.

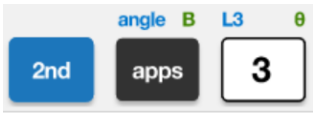
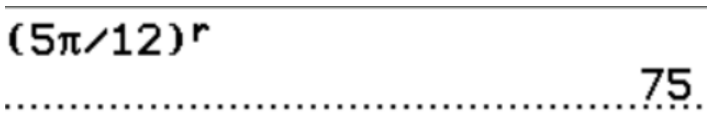
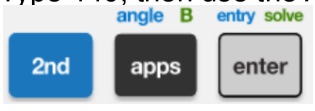
In order to see just the graph of the intersection, go to the Calculate menu 

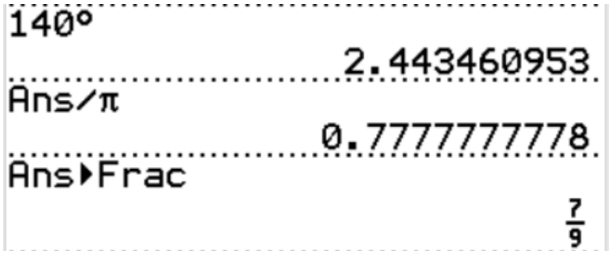
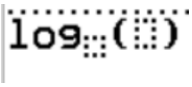
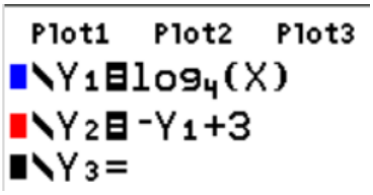
, and scroll right to the

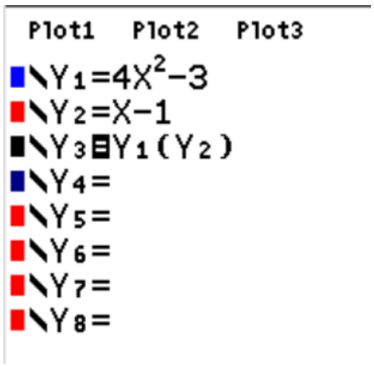
INEQUALITY menu:



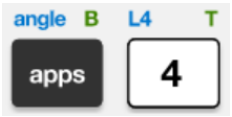
In Option 2 (Inequal Intersection), scroll to pick which color you prefer, then PRESS ENTER!

7	**N**	Students are given a function and asked to find the inverse function. On their answer sheets, they are asked if the original function is one-to-one. That notion can be checked with the Horizontal Line Test, and then they are asked to find the inverse algebraically before finding the graph of the inverse in the scavenger hunt. $f(x) = \sqrt[3]{6x + 4}$ $f^{-1}(x) = \frac{x^3 - 4}{6}$ **(SEE OTHER HINTS IN #2)**
8	**A**	Students are asked to write a sine function given an amplitude of 3 and a period of π. $y = 3sin(2\theta)$ The matching graph is featured with the ZoomTrig feature, which shows the graph with an x-axis scale of $\frac{\pi}{2}$. Students are also asked on their answer sheet about how to convert radians to degrees and degrees to radians on their calculators. From student answer sheet, convert $\frac{5\pi}{12}$ to degrees. In order to convert a radian measure to degree: a. Ensure that your calculator is in DEGREE mode. b. Type ($\frac{5\pi}{12}$), then use the ANGLE menu to indicate radians.  c. Then, press Enter.  From student answer sheet, convert 140° to radians. In order to convert a degree measure to radian: a. Ensure that your calculator is in RADIAN mode. b. Type 140, then use the ANGLE menu to indicate degrees. 

		c. Then, press Enter. d. Divide by π to put the radian measure in terms of π.  Answer: $\frac{7\pi}{9}$
9	**E**	Students are given the function $y = log_4 x$ and its graph. Then, students are asked to find the graph of the transformation: $-f(x) + 3$ Hints/Shortcuts: a. Students can type in the logarithmic function in a variety of ways. Here are two. 1. Using the logBASE operation in the Math menu (choice A):  Which gives a fillable logarithm for any base  2. Using the change of base formula, and simply using the  button: $\frac{log\ x}{log\ 4}$ b. To find the transformation, students can use the function menus (see question #2) to define the transformation in the $y =$ menu. 

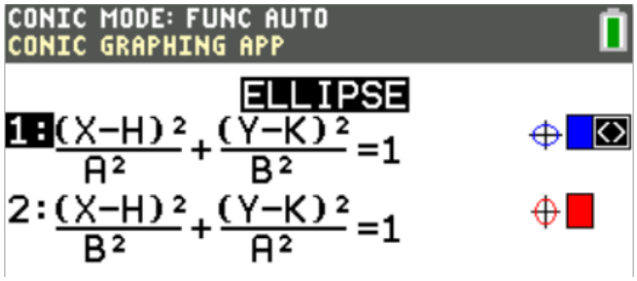
10	**R**	Students are asked to find $(f \circ g)(x)$ given two functions. Then, they are tasked with finding the graph of the composition along with a table of 3 particular function values. Some hints/shortcuts" Instead of finding the composition by hand, students can type $f(x)$ and $g(x)$ into Y_1 and Y_2, respectively, and then use one of the function menus to type the composition into Y_3 as $Y_1(Y_2)$. (For how to find the function menus, see hints in #2).  **NOTE:** $Y_1(Y_2)$ will find the COMPOSITION of functions, while $Y_1 * Y_2$ will find the PRODUCT. Students can choose to turn the original functions off in order to focus on the composition of functions. FOR NOTES ABOUT TABLE SETTINGS AND DISPLAY SETTINGS, SEE #3.
11	**L**	Students are asked to write a sine function given an amplitude of 3 and a period of π. $y = 3sin(\frac{1}{2}\theta)$ The matching graph is featured with the ZoomTrig feature, which shows the graph with an x-axis scale of $\frac{\pi}{2}$.
12	**B**	Students are asked to identify a conic section (ellipse) and then rewrite the general form of an ellipse into standard form. $\frac{(x-9)^2}{2^2} + \frac{(y-1)^2}{1^2} = 1$ Then, students are asked on their answer sheet how to use the Conics App on their calculator to create the graph.

Go to the Conics Graphing App:

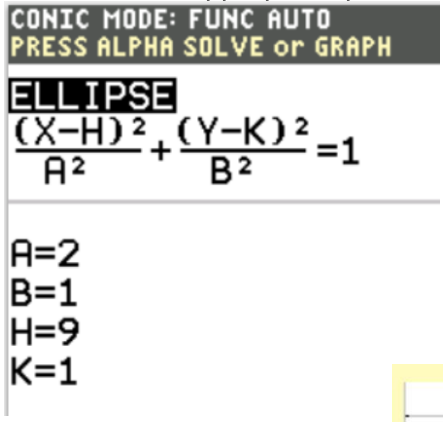


In this case, choose Ellipse from the menu:

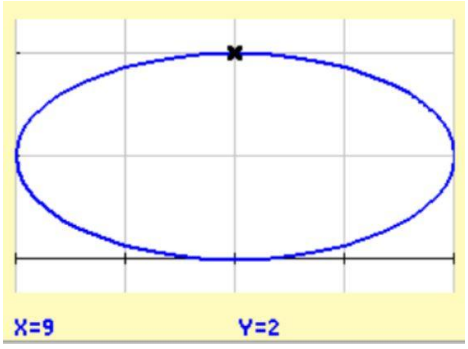
Students must decide if the ellipse is Horizontal or Vertical in orientation. In this case it is Horizontal, so choose option 1:

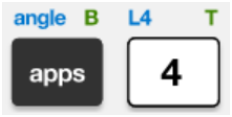


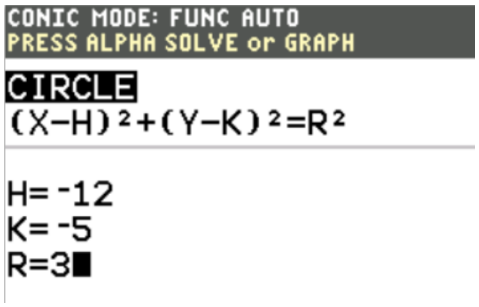
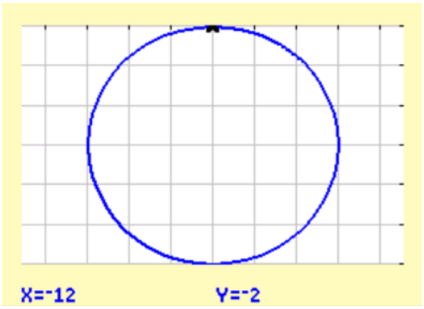
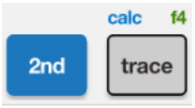
Then, fill in the appropriate parameters:

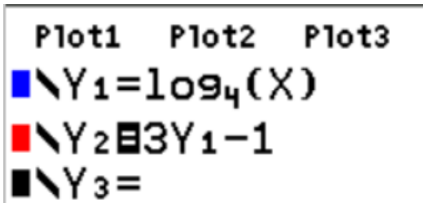
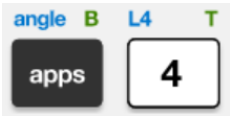
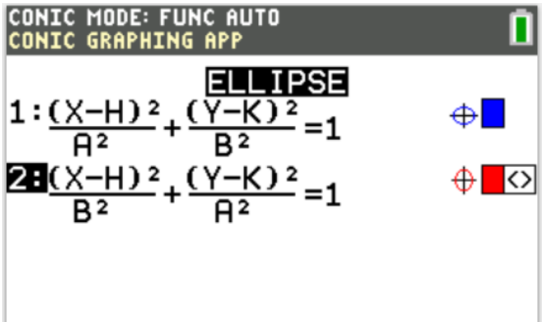


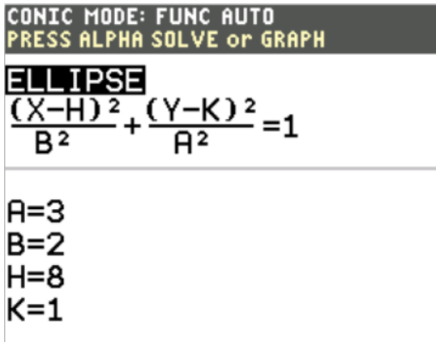
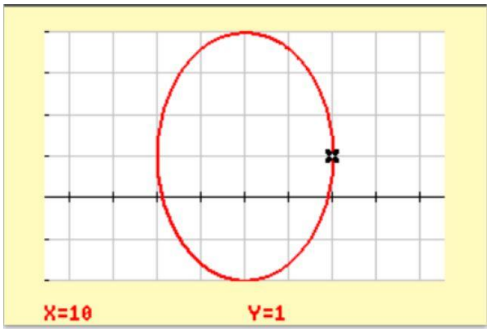
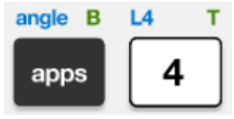
Graphs a traceable Ellipse. So, vertices are easily found as well.

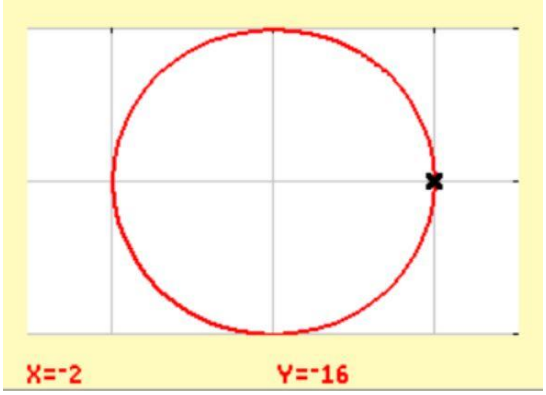


13	**D**	Students are given two graphs of the same quadratic function. One gives the minimum and one gives a zero. (Both can be found by using the calculator. After entering your function into the $y =$ menu and graphing it, use the calculate menu  to access both the "zero" and "minimum" functions. Both will ask for a left and right bound, then a guess, before providing the answer.) Hint: It would probably be wise for students to use the minimum and the zero to write the equation of the parabola in VERTEX FORM. $(y = a(x - h)^2 + k)$ The correct answer is $y = \frac{1}{3}(x - 4)^2 - 3$ Then, students must use their equation to find the appropriate table of values for the function.
14	**I**	Students are asked to identify a conic section (circle) and then rewrite the general form of an ellipse into standard form. $(x + 12)^2 + (y + 5)^2 = 3^2$ Then, students are asked on their answer sheet how to use the Conics App on their calculator to create the graph. Go to the Conics Graphing App:  Choose the Option 1 for the circle:  Circles can be defined by the standard form or the general form of the circle in the app. Because students are asked to find the standard form, you could use both to check the answer.

		Enter the parameters into the application:  The graph is then traceable. 
15	**K**	Students are asked to solve a system of equations involving a quadratic and a linear function. Students are asked to solve algebraically, but then check their work by finding the graphical solution. Once both equations are entered into the $y =$ menu, students can calculate both intersection points by going to the Calculate menu:  Then, select 5:intersect. The calculator will ask for the student to identify the first curve, the second curve, and then a guess for the intersection point before giving a solution. As this system has two real solutions, students will need to repeat this process to find the second solution.
16	**Q**	Students are given the function $y = log_4 x$ and its graph. Then, students are asked to find the graph of the transformation: $3f(x) - 1$

		To find the transformation, students can use the function menus (see question #2) to define the transformation in the $y =$ menu.  See other hints/shortcuts in question #9.
17	**F**	Students are asked to identify a conic section (ellipse) and then rewrite the general form of an ellipse into standard form. $\frac{(x-8)^2}{2^2} + \frac{(y-1)^2}{3^2} = 1$ Then, students are asked on their answer sheet how to use the Conics App on their calculator to create the graph. Go to the Conics Graphing App:  In this case, choose Ellipse from the menu:  Students must decide if the ellipse is Horizontal or Vertical in orientation. In this case it is Vertical, so choose option 2: 

		Then, fill in the appropriate parameters:  Graphs a traceable Ellipse. So, vertices are easily found as well. 
18	**G**	Students are asked to identify a conic section (circle) and then rewrite the general form of an ellipse into standard form. $(x+3)^2+(y+16)^2=1^2$ Then, students are asked on their answer sheet how to use the Conics App on their calculator to create the graph. Go to the Conics Graphing App:  Choose the Option 1 for the circle:  Circles can be defined by the standard form or the general form of the circle in the app. Because students are asked to find the

		standard form, you could use both to check the answer. Enter the parameters into the application: CIRCLE $(X-H)^2+(Y-K)^2=R^2$ H=-3 K=-16 R=1 The graph is then traceable. 

Bonus:

What calculator feature gives you a SEARCHABLE menu of ALL available functions/operations?

THE CATALOG 

The questions are answered in the following loop (so that students can start anywhere!):

1 → 5 → 11 → 14 → 2 → 18 → 9 → 3 → 16 → 13 → 4 → 8 → 15 → 6 → 17 → 10 → 12 → 7 (then loops back to 1)