Take 15 minutes to finish up the three problems left on pgs.43-44. Choose two methods for solving each...

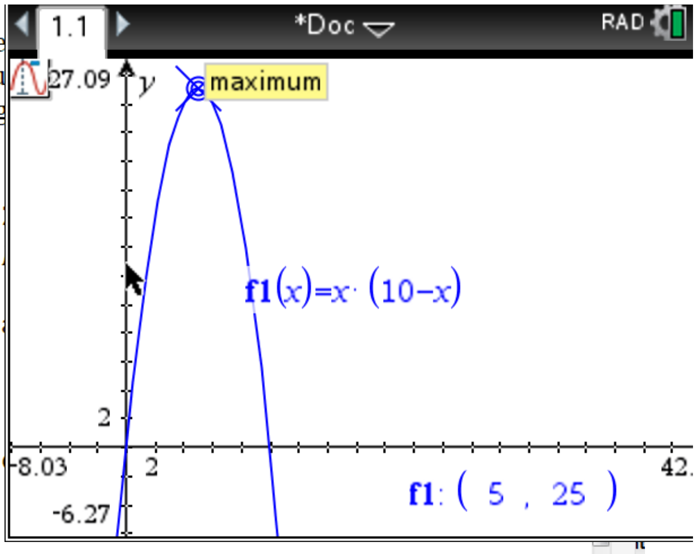
Questions on 3.7 HW?

Apr 8-8:30 AM

Solve: $2x^2+5x-12=0$	Carlos' Strategy	Zac's Strategy $f(x)=2x^2+5x-12$ $x=-4, 1.5$
Clarita's Strategy $(x+4)(2x-3)=0$ $x=-4, 3/2$ $\frac{3}{2}$ $3x-2=0$ $\frac{3x}{3}=\frac{2}{3}$ $\cancel{x=\frac{2}{3}}$ $2x-3=0$ $2x=3$ $x=3/2$	Tia's Strategy	Tehani's Strategy

Solve: $x^2+4x-8=0$	Carlos' Strategy	Zac's Strategy
Clarita's Strategy	Tia's Strategy	Tehani's Strategy

The given functions provide the connection betwe
rectangle for a given side length, x, and a set amou
different amounts of area you can close in with a g
create a rectangular enclosure.



1. $A(x) = x\,(10 - x\,)$

Find the following:

a. A(3) = 21 b. A(4) = 24

3(7) 4(6)=

c. A(6) = 24 d. $A(x) = 0$

6(4) 0 = x(10 − x)

(x = 0, 10)

e. When is A(x) at its maximum? Explain or show how you know.

e. When is A(x) at its maximum? Explain or show how you know.

3. $A(x) = x(\,75 - x)$

Find the following:

4. $A(x) = x(\,48 - x)$

Find the following:

8.50 x 11.00 in

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For each of the given quadratic equations find the solutions using an efficient method. the method you are using as well as the solutions. You must ~~use at least three different~~ one methods.

5. $x^2 + 17x + 60 = 0$

6. $x^2 + 16x + 39 = 0$

7. $x^2 + 7x - 5 = 0$

8. $3x^2 + 14x - 5 = 0$

$a = 3$
$b = 14$
$c = -5$

$$x = \frac{-14 \pm \sqrt{(14)^2 - 4\cdot 3\cdot -5}}{2\cdot 3}$$

9. $x^2 - 12x = -8$

$x^2 - 12x + 8 = 0$

10. $x^2 + 6x = 7$

$x^2 + 6x - 7 = 0$

Summarize the process for solving a quadratic by the indicated strategy. Give example along with written explanation, also indicate when it is best to use this strategy.

11. Completing the Square

$$x = \frac{-14 \pm \sqrt{196 - 4\cdot 3\cdot -5}}{6} = \frac{-14 \pm \sqrt{256}}{6}$$

12. Factoring

$$= \frac{-14 + 16}{6} \ \& \ \frac{-14 - 16}{6}$$

13. Quadratic Formula

$$\frac{2}{6} \ \& \ \frac{-30}{6}$$

$$\boxed{\frac{1}{3} \ \& \ -5}$$

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Home Tools SM2-Module 2 SE....

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Solve each system of equations using an algebraic method and check your work!

P
E
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AS

16.
$$\begin{cases} 3x + 5y = 15 \\ 3x - 2y = 6 \end{cases}$$

$3x + \cancel{5y} = 15$
$\quad \cancel{-5y} \quad -5y$

$\frac{\cancel{3}x}{\cancel{3}} = \frac{15-5y}{3}$

$\cancel{3}\left(\frac{15-5y}{\cancel{3}}\right) - 2y = 6$

$15 - 5y - 2y = 6$

$15 - 7y = 6$

$-15 \qquad -15$

$-7y = -9$

$\frac{-7y}{-7} = \frac{-9}{-7}$

$y = \frac{9}{7}$

$3x + 5\left(\frac{9}{7}\right) = 15$

$3x + \frac{45}{7} = 15$

$3x = 15 - \frac{45}{7}$

$\frac{\cancel{3}x}{\cancel{3}} = \frac{60}{7}$

$x = \frac{60}{7} \div \frac{3}{1}$

$x = \frac{60}{7} \cdot \frac{1}{3}$

$x = \frac{60}{21} = \frac{20}{7}$

$\boxed{\left(\frac{20}{7}, \frac{9}{7}\right)}$

17.
$$\begin{cases} y = -7x + 12 \\ y = 5x - 36 \end{cases}$$

18.
$$\begin{cases} y = 2x + 12 \\ y = 10x - x^2 \end{cases}$$

19.
$$\begin{cases} y = 24x - x^2 \\ y = 8x + 48 \end{cases}$$

$24x - x^2 = 8x + 48$

$0 = x^2 - 24x + 8x + 48$

8.50 x 11.00 in

Solve: $8x^2 + 2x = 3$	<u>Carlos' Strategy</u>	<u>Zac's Strategy</u>
<u>Clarita's Strategy</u>	<u>Tia's Strategy</u>	<u>Tehani's Strategy</u>

Describe why each strategy works.

As the students continue to try out their strategies, they notice that sometimes one strategy works better than another. Explain how you would decide when to use each strategy.

3.8 To Be Determined . . .

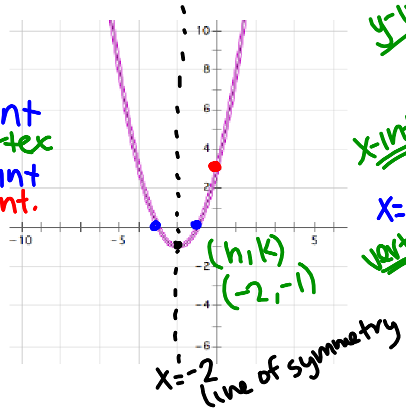
A Develop Understanding Task

Israel and Miriam are working together on a homework assignment. They need to write the equations of quadratic functions from the information given in a table or a graph. At first, this work seemed really easy. However, as they continued to work on the assignment, the algebra got more challenging and raised some interesting questions that they can't wait to ask their teacher.

Work through the following problems from Israel and Miriam's homework. Use the information in the table or the graph to write the equation of the quadratic function in all three forms. You may start with any form you choose, but you need to find all three equivalent forms. (If you get stuck, your teacher has some hints from Israel and Miriam that might help you.)

1.

x	y	
-5	8	
-4	3	
-3	0	* x-int
-2	-1	* vertex
-1	0	* x-int
0	3	* y-int.
1	8	
2	15	
3	24	
4	35	
5	48	



y-int

Standard form:
ax^2+bx+c

$x^2+x+3x+3 = x^2+4x+3$

x-int

Factored form: $(x--3)(x--1)$

$(x-d)(x-e)$

$x = -3, -1$

$(x+3)(x+1)$

vertex

Vertex form:
$a(x-h)^2+k$

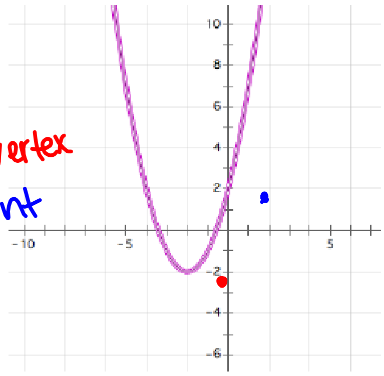
$(x--2)^2+-1$

$(x+2)^2-1$

x	y
-5	7
-4	2
-3	-1
-2	-2
-1	-1
0	2
1	7
2	14
3	23
4	34
5	47

vertex

yint



Standard form:

x^2+4x+2

Factored form:

$(x- -2+\sqrt{2})(x--2-\sqrt{2})$

$(x+2+\sqrt{2})(x+2-\sqrt{2})$

Vertex form:

$(x--2)^2+-2$

$(x+2)^2-2$

a = 1
b = 4
c = 2

$$x = \frac{-4 \pm \sqrt{(4)^2-4\cdot1\cdot2}}{2\cdot1}$$

$$x = \frac{-4\pm\sqrt{8}}{2}$$

$\sqrt{8} = \sqrt{4\cdot2} = 2\sqrt{2}$

$$x = \frac{-4\pm2\sqrt{2}}{2}$$

$$x = -\frac{\cancel{4}}{\cancel{2}} \pm \frac{\cancel{2}\sqrt{2}}{\cancel{2}}$$

$\boxed{x = -2\pm\sqrt{2}}$

$(x+2)(x+2)-2$

$x^2+2x+2x+4-2$

x^2+4x+2

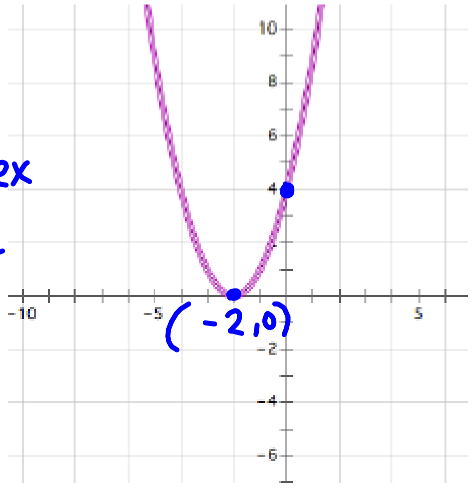
Nov 14-7:57 AM

3.

x	y
-5	9
-4	4
-3	1
-2	0
-1	1
0	4
1	9
2	16
3	25
4	36
5	49

*vertex

y-int



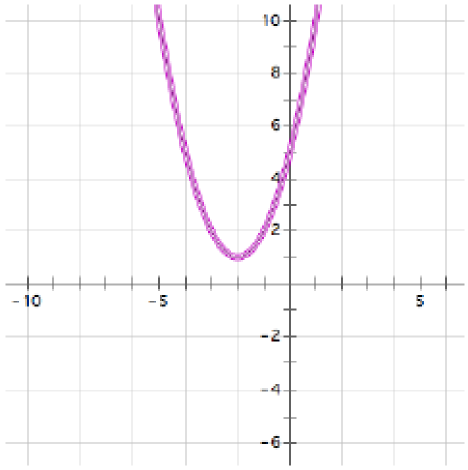
Standard form:
$x^2+2x+2x+4$
x^2+4x+4

Factored form:
$(x+2)(x+2)$

Vertex form:
$(x--2)^2+0$
$(x+2)^2$

4.

x	y
-5	10
-4	5
-3	2
-2	1
-1	2
0	5
1	10
2	17
3	26
4	37
5	50



Standard form:

Factored form:

Vertex form:

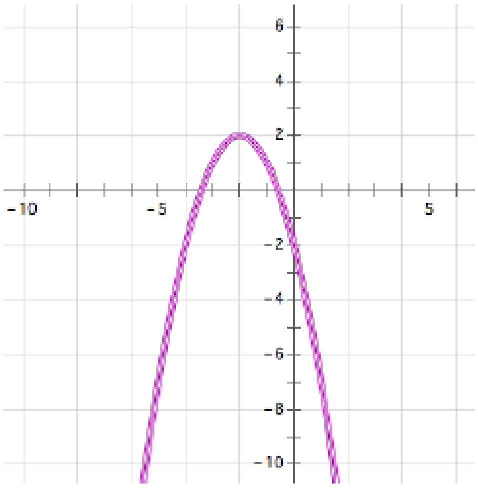
5. Israel was concerned that his factored form for the function in question 4 didn't look quite right. Miriam suggested that he test it out by plugging in some values for x to see if he gets the same points as those in the table. Test *your* factored form. Do you get the same values as those in the table?

6. Why might Israel be concerned about writing the factored form of the function in question 4?

Here are some more of Israel and Miriam's homework.

7.

x	y
-5	-7
-4	-2
-3	1
-2	2
-1	1
0	-2
1	-7
2	-14
3	-23
4	-34
5	-47



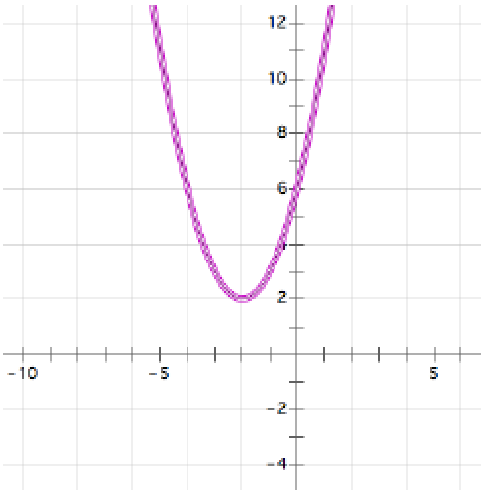
Standard form:

Factored form:

Vertex form:

8.

x	y
-5	11
-4	6
-3	3
-2	2
-1	3
0	6
1	11
2	18
3	27
4	38
5	51



Standard form:

Factored form:

Vertex form:

9. Miriam notices that the graphs of function 7 and function 8 have the same vertex point. Israel notices that the graphs of function 2 and function 7 are mirror images across the *x*-axis. What do you notice about the roots of these three quadratic functions?

The Fundamental Theorem of Algebra

A polynomial function is a function of the form:

$$y = a_0x^n + a_1x^{n-1} + a_2x^{n-2} + \cdots a_{n-3}x^3 + a_{n-2}x^2 + a_{n-1}x + a_n$$

where all of the exponents are positive integers and all of the coefficients $a_0 \ldots a_n$ are constants.

As the theory of finding roots of polynomial functions evolved, a 17th century mathematician, Girard (1595-1632) made the following claim which has come to be known as the Fundamental Theorem of Algebra: *An n^{th} degree polynomial function has n roots.*

In later math classes you will study polynomial functions that contain higher-ordered terms such as x^3 or x^5. Based on you work in this task, do you believe this theorem holds for quadratic functions? That is, do all functions of the form $y = ax^2 + bx + c$ always have two roots? [Examine the graphs of each of the quadratic functions you have written equations for in this task. Do they all have two roots? Why or why not?]

Nov 14-8:00 AM

Homework

3.8 MVP "Ready, Set, Go"