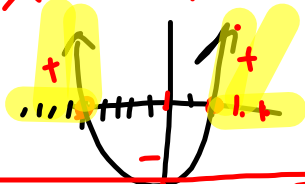


3.11 lesson.

8. $x^2 + 3x - 10 \geq 0$
 $(x+5)(x-2)$

$$\begin{array}{r} -10 \\ 5 \times -2 \\ 3 \end{array}$$

$x = -5, 2$



$x \leq -5, x \geq 2$

factor by grouping method

9. $2x^2 - 5x - 12 < 0$

$2x^2 - 5x - 12 < 0$ (dashed)

$2x^2 + 3x - 8x - 12$

$x(2x+3) - 4(2x+3)$

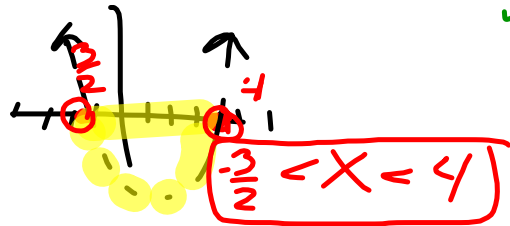
$(2x+3)(x-4) = 0$

$x = -\frac{3}{2}, 4$

magic x method

$$\begin{array}{r} 2 \div 12 \\ 3 \times -4 \\ -2 \times -5 \end{array}$$

$(2x+3)(x-4)$

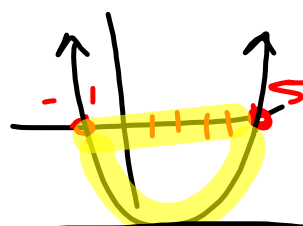


10. $x^2 - 4 \leq 4x + 1$

$x^2 - 4x - 5 \leq 0$

$x = -1, 5$

$$\begin{array}{r} -5 \\ 1 \times 5 \\ -4 \end{array}$$



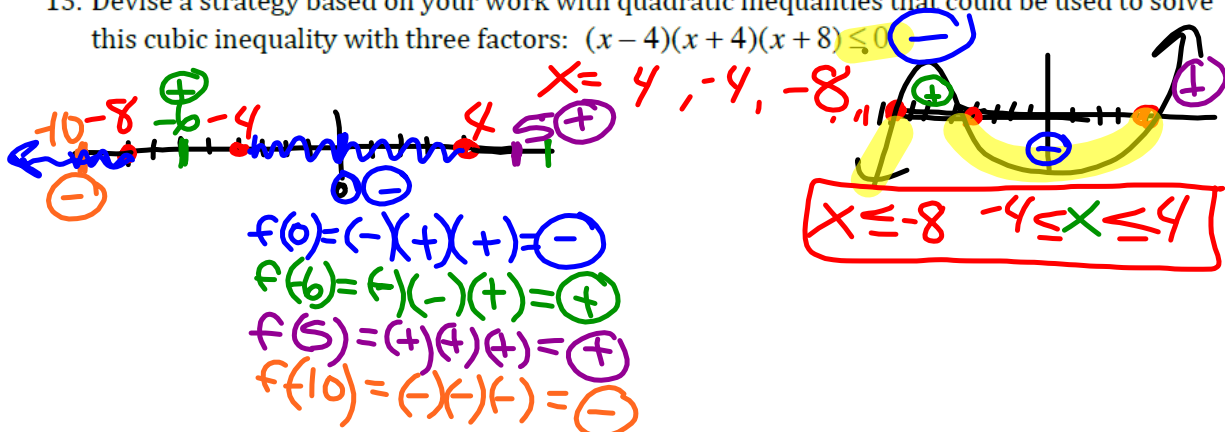
$-1 \leq x \leq 5$

$$(x - 4)(x + 4)(x + 8) \leq 0$$

Because Carlos doesn't know how to graph cubic polynomials any better than he can factor them, he is wondering how his work with quadratic inequalities might help him solve this cubic inequality.

A7 class notes *line sign test*

13. Devise a strategy based on your work with quadratic inequalities that could be used to solve this cubic inequality with three factors: $(x - 4)(x + 4)(x + 8) \leq 0$



14. Use the solutions to this cubic inequality to determine the dimensions of rectangular boxes that meet their criteria.

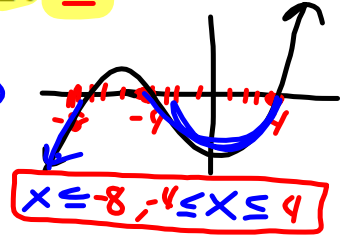
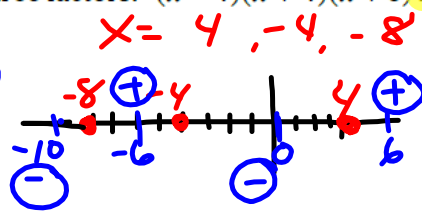
$$(x - 4)(x + 4)(x + 8) \leq 0$$

Because Carlos doesn't know how to graph cubic polynomials any better than he can factor them, he is wondering how his work with quadratic inequalities might help him solve this cubic inequality.

A5 class notes

13. Devise a strategy based on your work with quadratic inequalities that could be used to solve this cubic inequality with three factors: $(x - 4)(x + 4)(x + 8) \leq 0$

x	y
-10	$(-)(-)(-) = (-)$
-8	0
-6	$(-)(-)(+) = (+)$
-4	0
0	$(-)(+)(+) = (-)$
4	0
6	$(+)(+)(+) = (+)$



14. Use the solutions to this cubic inequality to determine the dimensions of rectangular boxes that meet their criteria.

Intro to grouping method

15. Here is the algebra work produced by Carlos' cousin. Explain each step in the process that led from Carlos' inequality to his cousin's **try #1 from homework**

$$\begin{aligned}
 &x(x-2)(x+8) \leq 96 \\
 &x(x^2+6x-16) \leq 96 \\
 &x^3+6x^2-16x \leq 96 \\
 &x^3+6x^2-16x-96 \leq 0 \\
 &x^2(x+6)-16(x+6) \leq 0 \\
 &(x^2-16)(x+6) \leq 0 \\
 &(x-4)(x+4)(x+6) \leq 0
 \end{aligned}$$

$x = 4 \quad -4 \quad -6$

1) $x^2 + x - 12$

$$\begin{array}{r}
 x^2 + x - 12 \\
 \underline{-3 \quad 4} \\
 x^2 + 4x - 3x - 12 \\
 x(x+4) - 3(x+4) \\
 (x+4)(x-3)
 \end{array}$$

check

$$\begin{aligned}
 &x(x+4) - 3(x+4) \\
 &x^2 + 4x - 3x - 12 \\
 &x^2 + x - 12 \quad \checkmark
 \end{aligned}$$

7)

$$\begin{aligned}
 &2x^2 - 9x - 5 \\
 &\underline{2x^2 - 10x + 1x - 5} \\
 &2x(x-5) + 1(x-5) \\
 &(x-5)(2x+1)
 \end{aligned}$$

$$\begin{array}{r}
 2x^2 - 9x - 5 \\
 \underline{-10 \quad -5} \\
 2x^2 - 10x + 1x - 5 \\
 -9 \quad -5
 \end{array}$$

SOLVING QUADRATICS & OTHER EQUATIONS - 3.11H

3.11H

READY, SET, GO!

Name

Period

Date

READY

Topic: Factoring Polynomials

Factor each of the polynomials completely.

1.

$x^2 + x - 12$

~~$-3 \quad 4$

 $(x-3)(x+4)$

 $x = 3, -4$~~

2.

$x^2 - 2x - 8$

3.

$x^2 + 5x - 14$

4.

~~$x^2 - x - 6$

 $(x-3)(x+2)$

 $x = 3, -2$~~

5.

$x^2 + 6x + 9$

6.

$x^2 - 7x + 10$

7.

$2x^2 - 9x - 5$

 $(2x+1)(x-5)$

~~-10

 -9~~

8.

$3x^2 - 3x - 18$

$3(x^2 - x - 6)$

 $3(x-3)(x+2)$

9.

$2x^2 + 8x - 42$

10. How is the factored form of a quadratic helpful when graphing the parabola?

SET

SET

Topic: Solving Quadratic Inequalities

Solve each of the quadratic inequalities.

11. *← See previous section.*

$$x^2 + x - 12 > 0$$

$x = 3, -4$



14. $2x^2 - 9x - 5 \geq 0$

12.

$$x^2 - 2x - 8 \leq 0$$

13.

$$x^2 + 5x - 14 \geq 0$$

15.

$$3x^2 - 3x - 18 < 0$$

16.

$$x^2 + 4x - 21 < 0$$

17.

(x+0) $x^2 - 4x \leq 0$
 $x(x-4) \leq 0$
 $x = 0, 4$

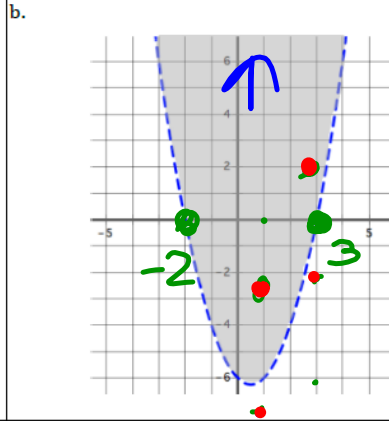
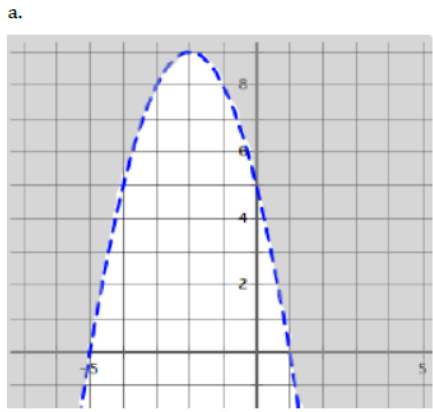


18.

$$x^2 \leq 25$$

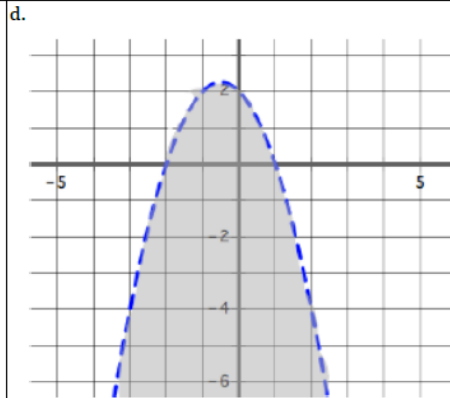
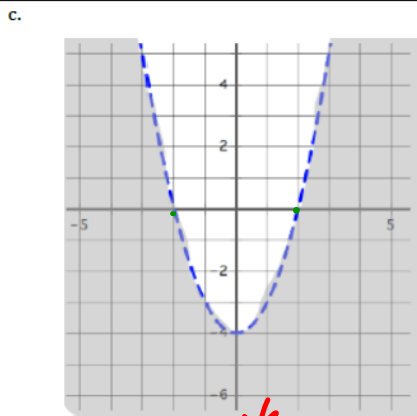
19.

$$x^2 - 4x \leq 5$$



For any x-value, the higher/"greater" y value is inside of the shaded region

$y > x^2 - x - 6$
 $y > x$



20. $y > x^2 - x - 6$
 $(x-3)(x+2)$
 $3, -2$
 ~~$-3, 2$~~
 ~~-1~~
 (B)

21. $y < x^2 - 4$

22. $y < (x+2)(1-x)$

23. $y > 5 - 4x - x^2$

GO

Topic: Vertex form of quadratic equations

Write each quadratic function below in vertex form.

$$a(x-h)^2 + k$$

$$x = -\frac{b}{2a}$$

24. $\begin{matrix} ||| \\ ||| \\ ||| \\ \hline 9 \end{matrix} + 5 = -9$
 $\frac{-6}{-4}$

25.

26.

$$f(x) = x^2 + 6x + 5$$

$$f(x) = (x+3)(x-5)$$

$$f(x) = (x-2)(x+6)$$

$$x = -\frac{b}{2a} = \frac{-6}{2(1)} = -3$$

$$x = -3, 5$$

$$y = (-3)^2 + 6(-3) + 5$$

$$9 - 18 + 5$$

$$y = -4$$

middle axis of sym.

$$y = (x+3)^2 - 4$$

$(-3, -4)$

$$y = (1+3)(1-5)$$

$$(4)(-4)$$

$$y = -16$$

$(1, -16)$

27.

$$f(x) = x^2 - 12x + 20$$

28.

$$f(x) = 2x^2 + 16x + 8$$

29.

$$f(x) = x^2 - 2x - 8$$

$$y = (x-1)^2 - 16$$

$$2 \left(\begin{matrix} ||| \\ ||| \\ ||| \\ \hline 16 \end{matrix} \right) + 8 = 32$$

$$2(x+4)^2 - 24$$