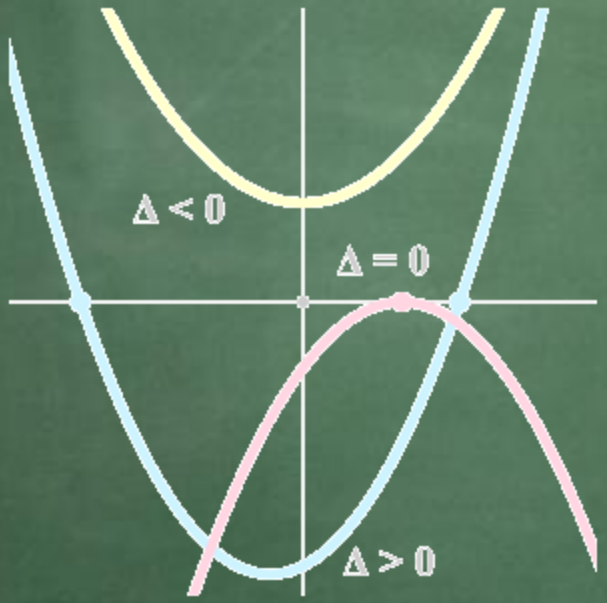
ANNOUNCEMENTS

- GOOD MORNING or GOOD AFTERNOON
- AGENDA FOR TODAY
  - ❑Quickly Review Absolute Values
  - ❑Graphing Quadratics
    - ❑Vertex Form
    - ❑Calculator Activity

M314 Algebra II

Section 9-4 and 9-5:
Quadratics



Presented by,

Mr. Kruczinski

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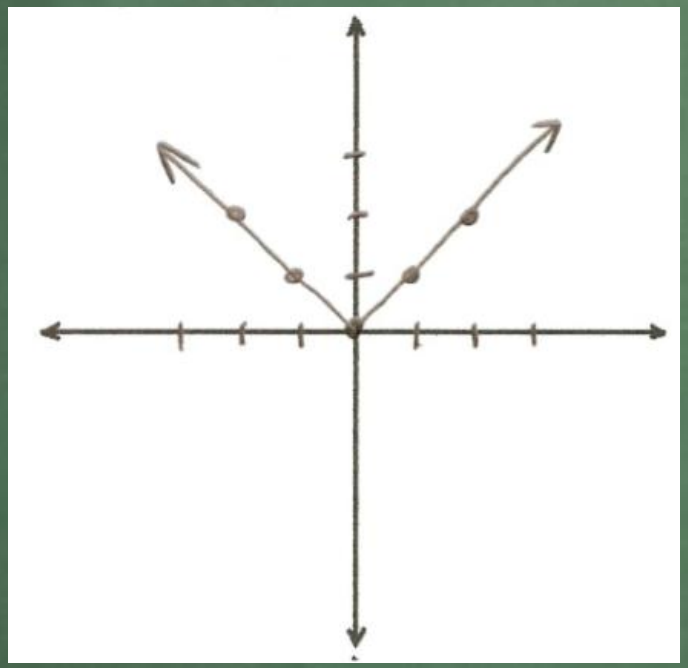
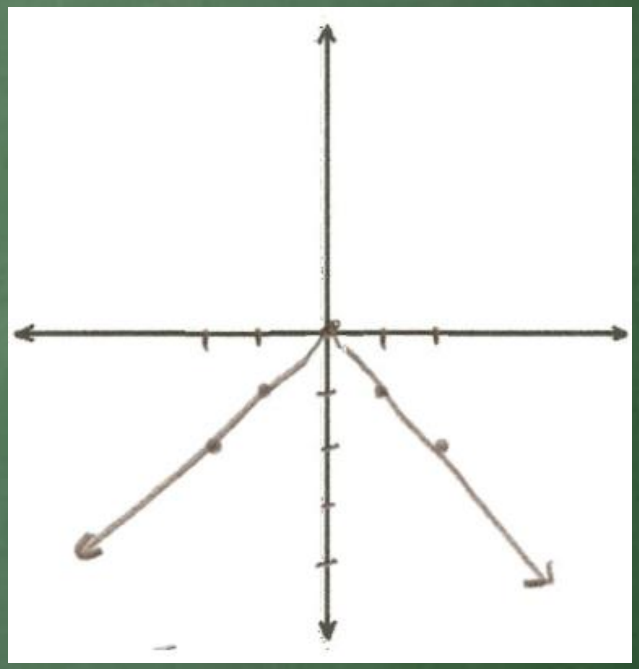
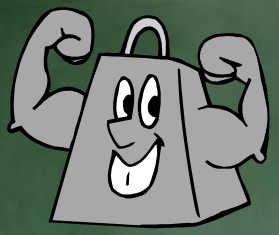
Absolute Value Graphs Review

1. $y = |x|$

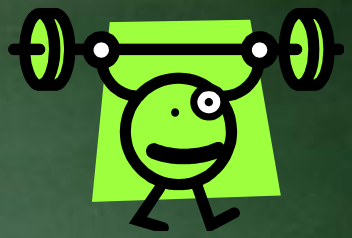


2. $y = -|x|$





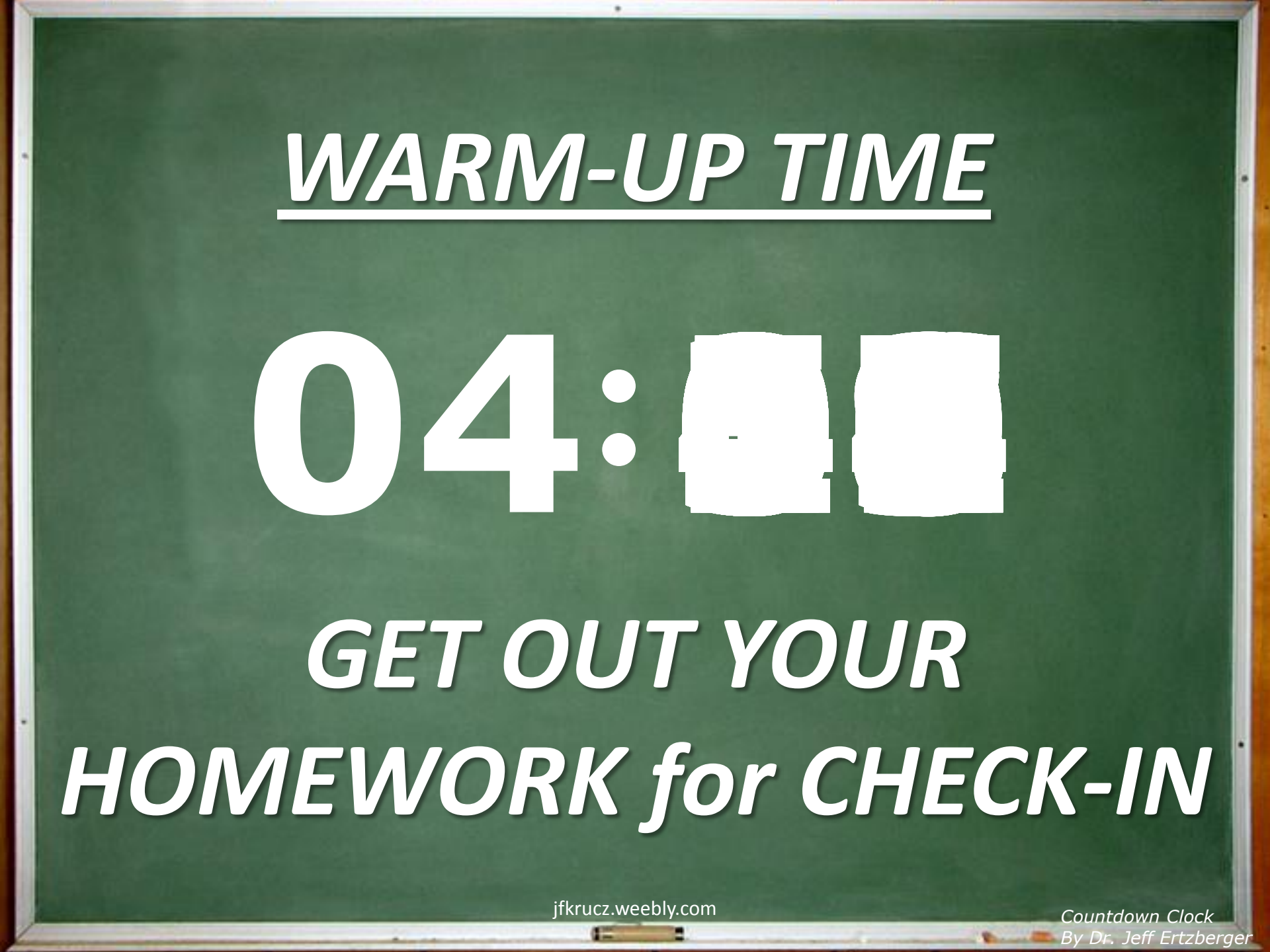
Warm up



$$y = a|x - h| + k$$

Vertex:	(h,k)
Axis of Symmetry:	x=h
Opens up	If “a” is positive
Opens down	If “a” is negative
Slope:	Slope is equal to “+a”

WARM-UP TIME



GET OUT YOUR HOMEWORK for CHECK-IN

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WARM-UP TIME

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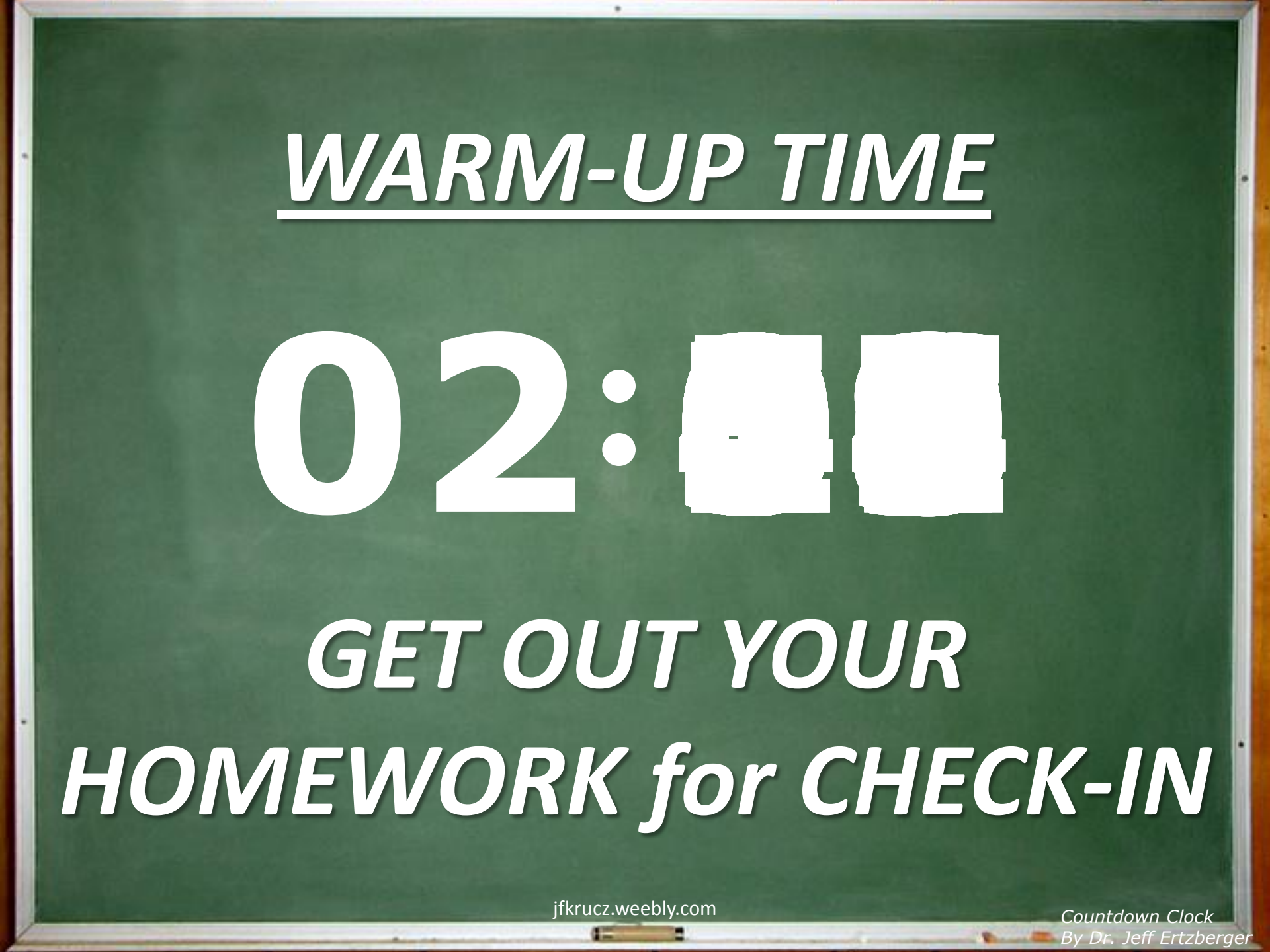

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- IF YOU ARE CONTINUING TO READ THIS SLIDE, THEN PLEASE **RAISE YOUR LEFT HAND**.
- THANK YOU!

1. $y = |x + 2| - 3$

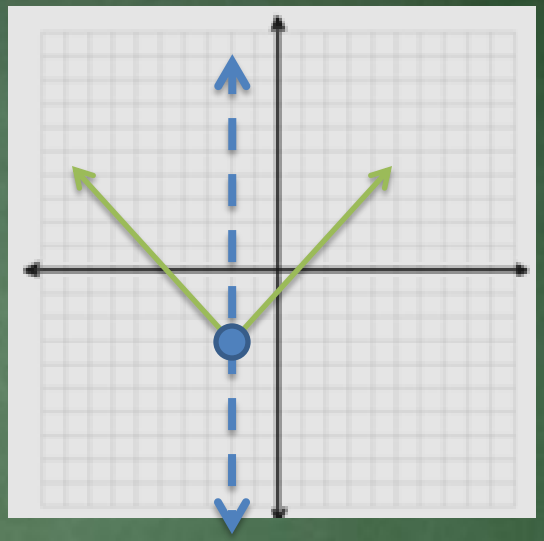
h= -2 k= -3

VERTEX: (-2,-3)

AXIS of SYMMETRY: X=-2

OPENS UP or DOWN: up

SLOPE: ±1



2. $y = 2|x - 5| + 1$

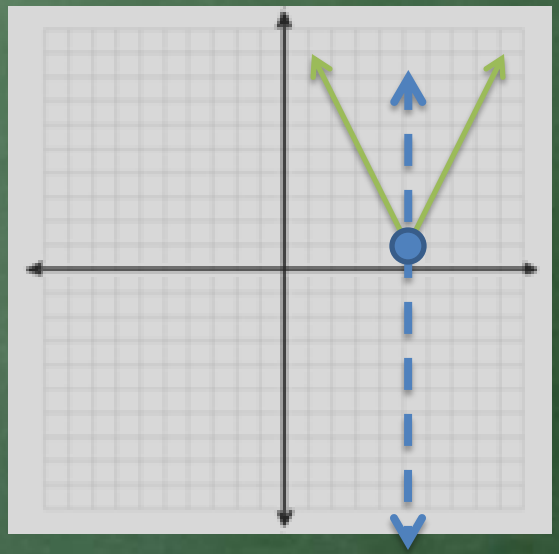
h= 5 k= 1

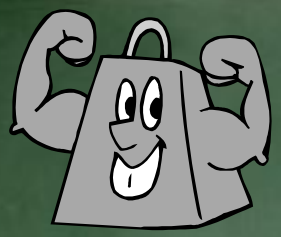
VERTEX: (5,1)

AXIS of SYMMETRY: X=5

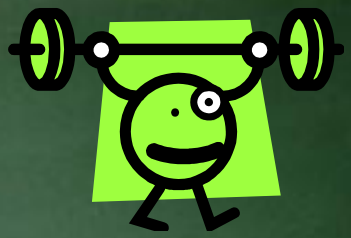
OPENS UP or DOWN: up

SLOPE: ±2





Warm-Up (Cont.)



3. $y = -|x - 4| + 5$

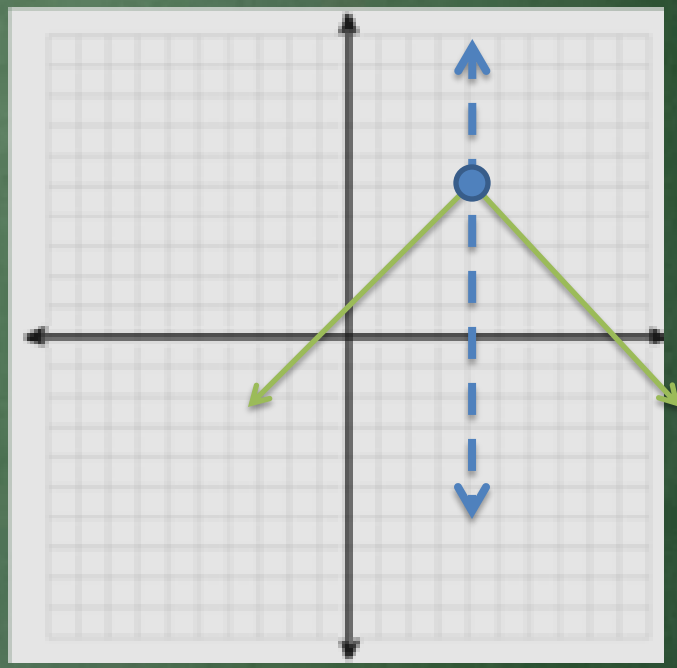
h= 4 k= 5

VERTEX: (4,5)

AXIS of SYMMETRY: X=4

OPENS UP or DOWN: down

SLOPE: ± 1



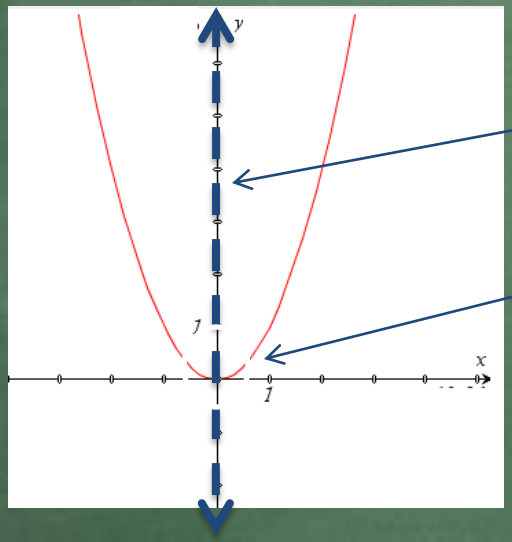
Graphs of Quadratic Functions

A quadratic function is a function that can be described as…

$F(x) = ax^2 + bx + c$, where $a \neq 0$

$y = ax^2 + bx + c$

Consider the following graph of $f(x) = x^2$



This shape is called a Parabola (Para- "BOWL"-a)

This is considered the line [or axis] of Symmetry
It can be expressed as x = 0

This point is called the vertex.
We can notate it as (0,0).

What is the DOMAIN of this function? All Reals

What is the RANGE of this function? $y \geq 0$

Example # 1

- Vertex:

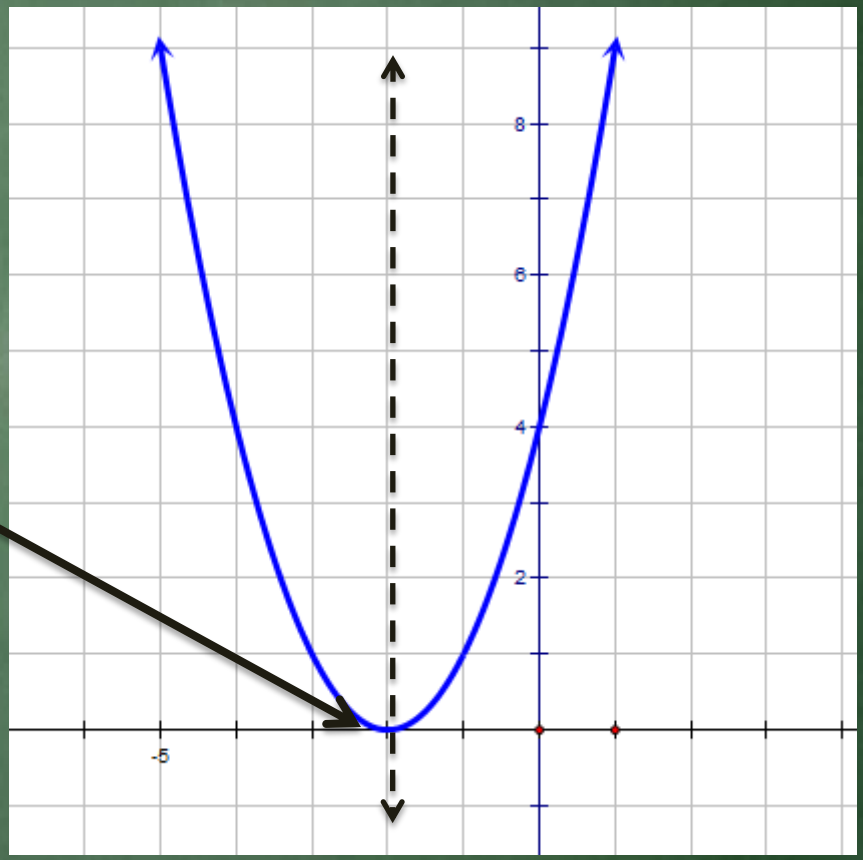
  (-2,0)
- Line of symmetry:

  x = -2
- Minimum/Max:

  There is a minimum (the vertex) (-2,0)
- Domain

  All Real Numbers
- Range

  $y \geq 0$



Example # 2

- Vertex:

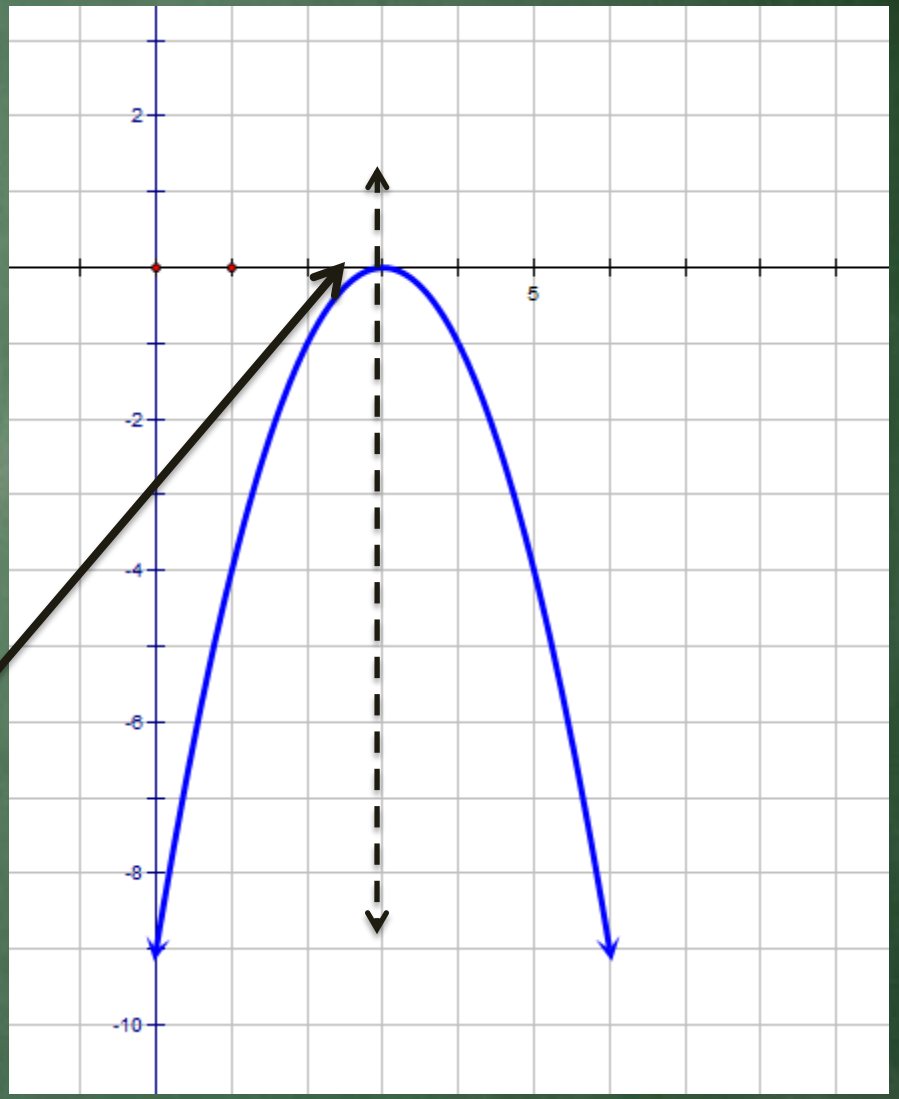
  (3,0)
- Line of symmetry:

  x= 3
- Minimum/Max:

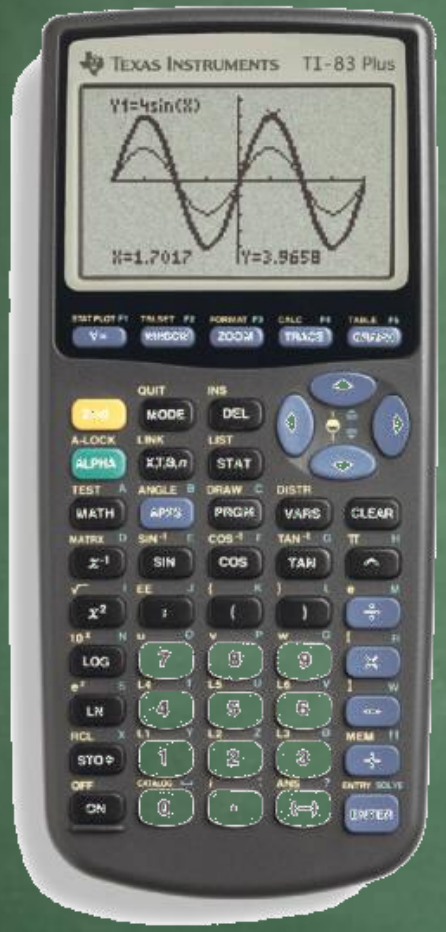
  There is a maximum (the vertex) (3,0)
- Domain

  All Real Numbers
- Range

  $y \leq 0$



Calculator Activity (Worksheet #1)



Rules and Guidelines

- You can work with a partner
- Group A: Question 1 &2
- Group B: Question 3 & 4
- Group C: Question 5 & 6
- If you finish your assigned questions continue on.
- You have 5 minutes to do the activity

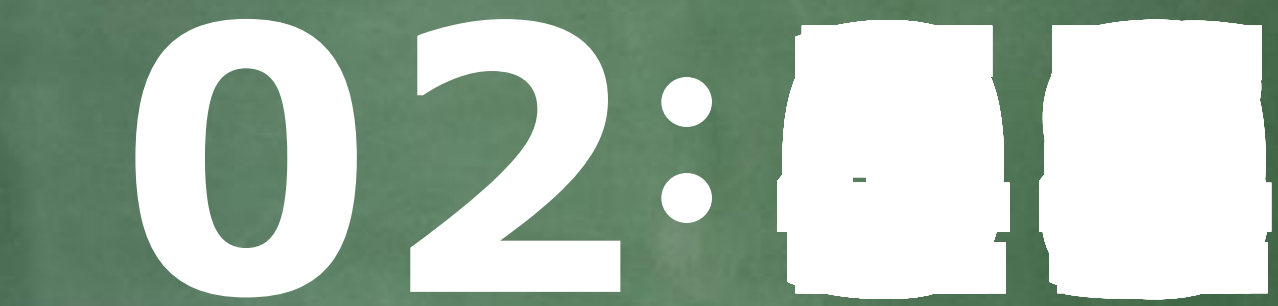
Calculator Activity

If you finish early continue on with the Packet

Calculator Activity

If you finish early continue on with the Packet

Calculator Activity



If you finish early continue on with the Packet

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Calculator Activity

If you finish early continue on with the Packet

Calculator Activity

If you finish early continue on with the Packet

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- THANK YOU!

SKETCHPAD DEMO

Discussion of Calculator Activity

The Standard form for Quadratic Functions

$$f(x) = a\,(x - h)^2 + k$$

We like this form of the function because we can quickly get the information below…

Vertex	(h, k)
Line of Symmetry	x = h
Opens up	a is positive
Opens down	a is negative

EXAMPLES:

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

1. $f(x) = 2(x-3)^2 + 5$ h = 3 k= 5

a. What is the vertex?	(3, 5)
b. What is the line of symmetry?	x = 3
c. Opens up or down	Opens up (because a is positive)

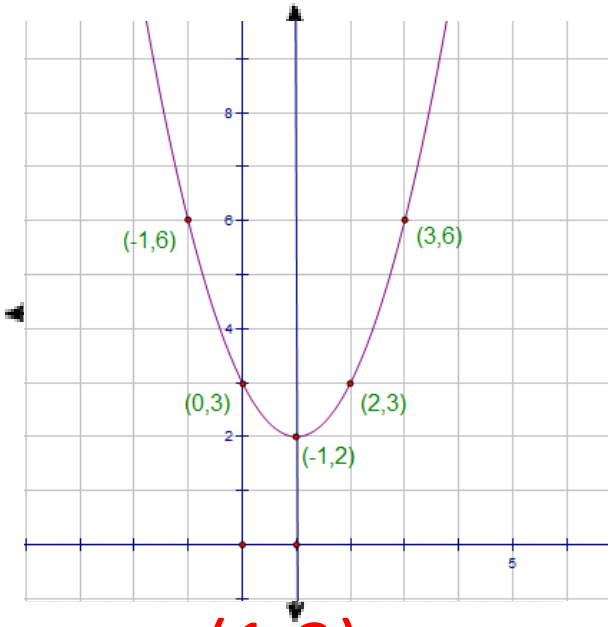
2. $f(x) = -(x-2)^2 + 3$ h = 2 k= 3

a. What is the vertex?	(2, 3)
b. What is the line of symmetry?	x = 2
c. Opens up or down?	Open Down (because a is negative)

Whole Class EXAMPLES

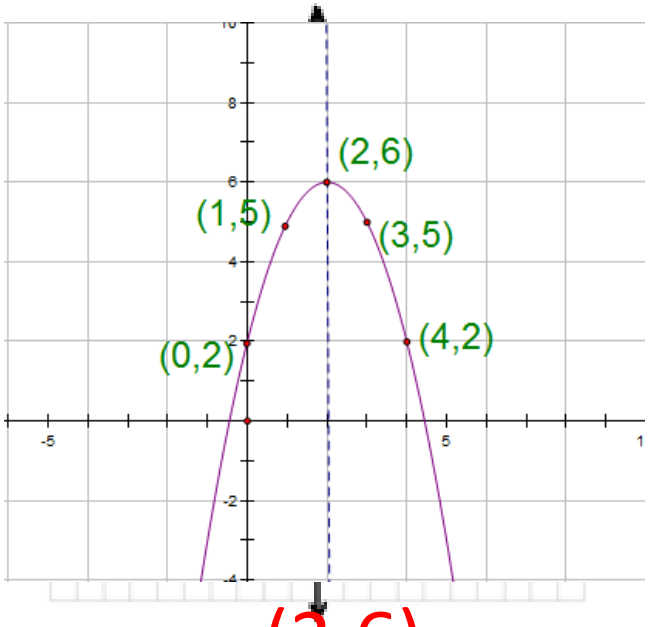
Graph the following:

1. $f(x) = (x-1)^2 + 2$



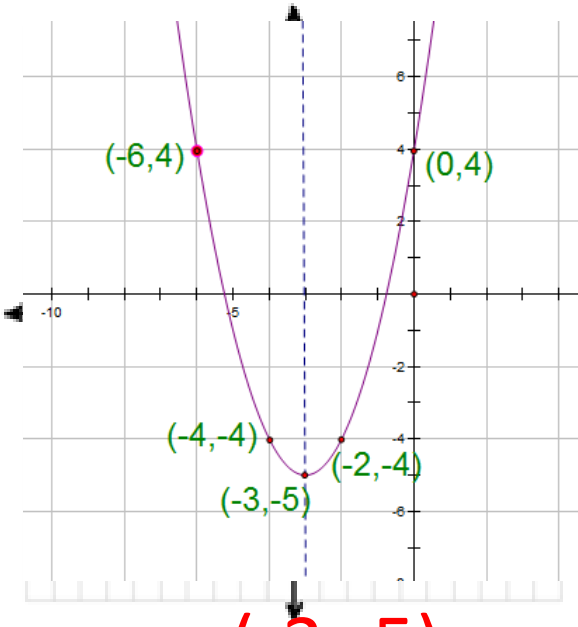
VERTEX: (1,2)
AXIS of SYM: x = 1
OPENS: up
Min or Max: min

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



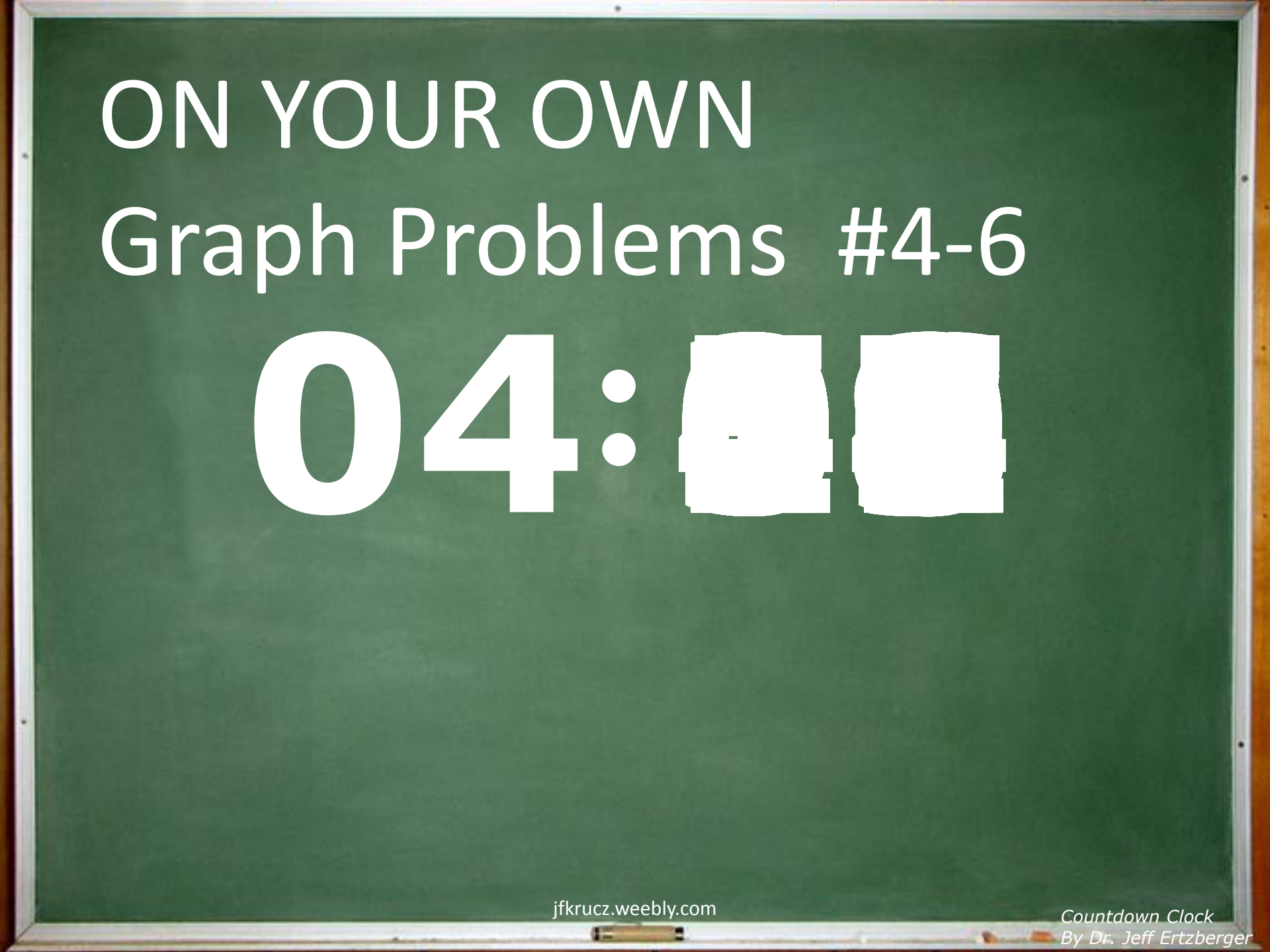
VERTEX: (2,6)
AXIS of SYM: x = 2
OPENS: down
Min or Max: max

3. $f(x) = (x+3)^2 - 5$



VERTEX: (-3,-5)
AXIS of SYM: x = -3
OPENS: up
Min or Max: min

ON YOUR OWN
Graph Problems #4-6



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Graph Problems #4-6

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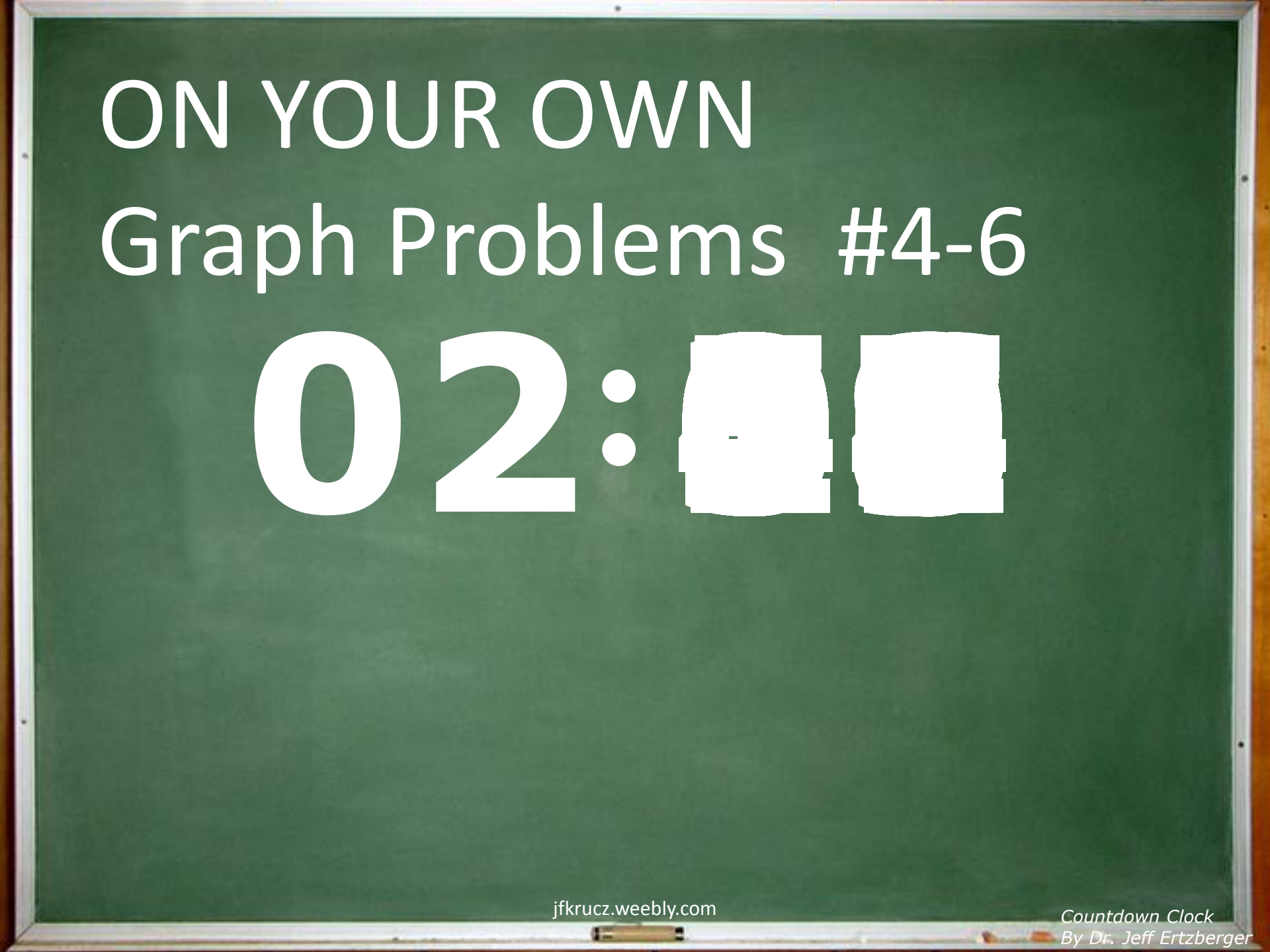
Graph Problems #4-6



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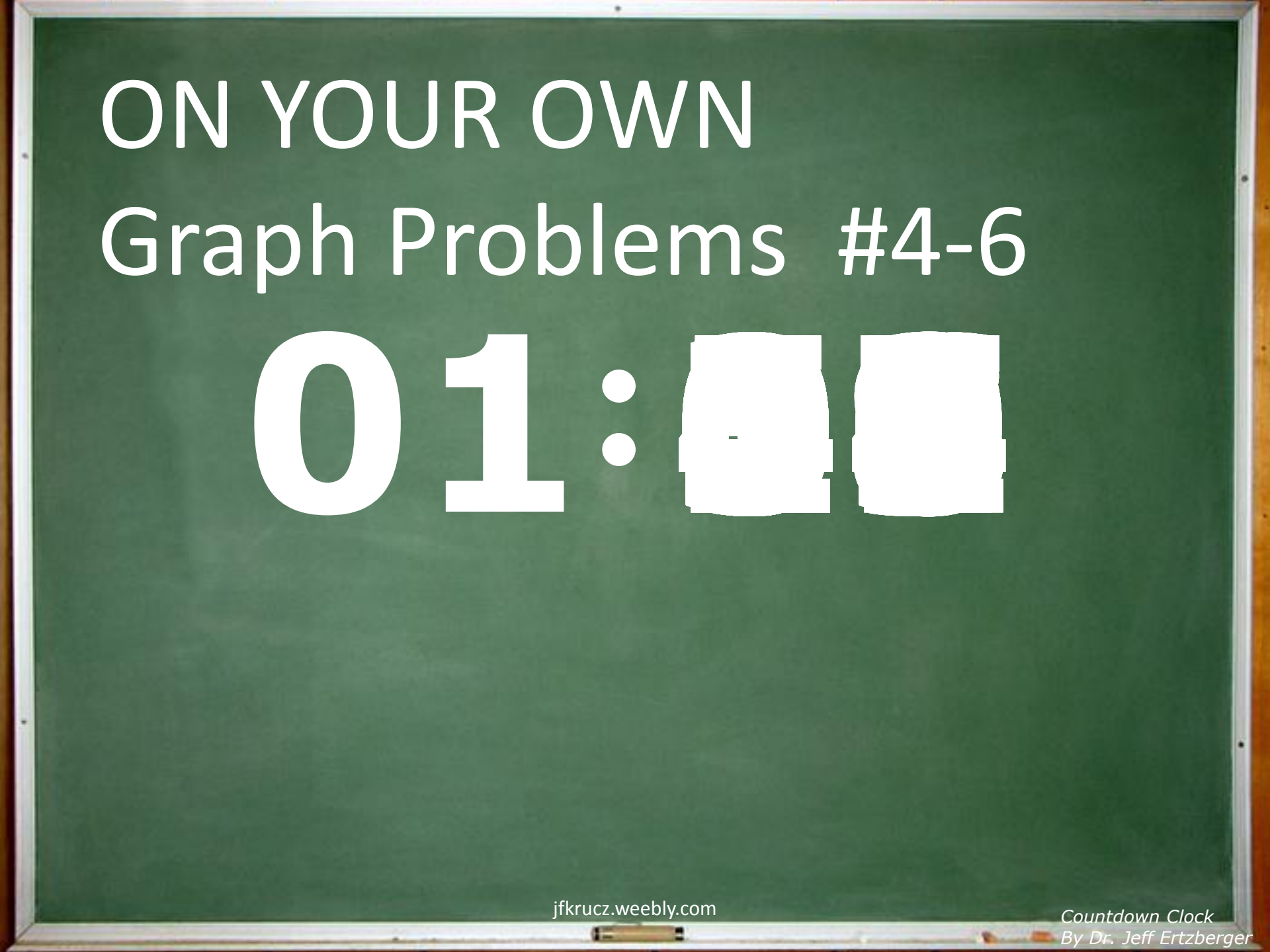
ON YOUR OWN
Graph Problems #4-6



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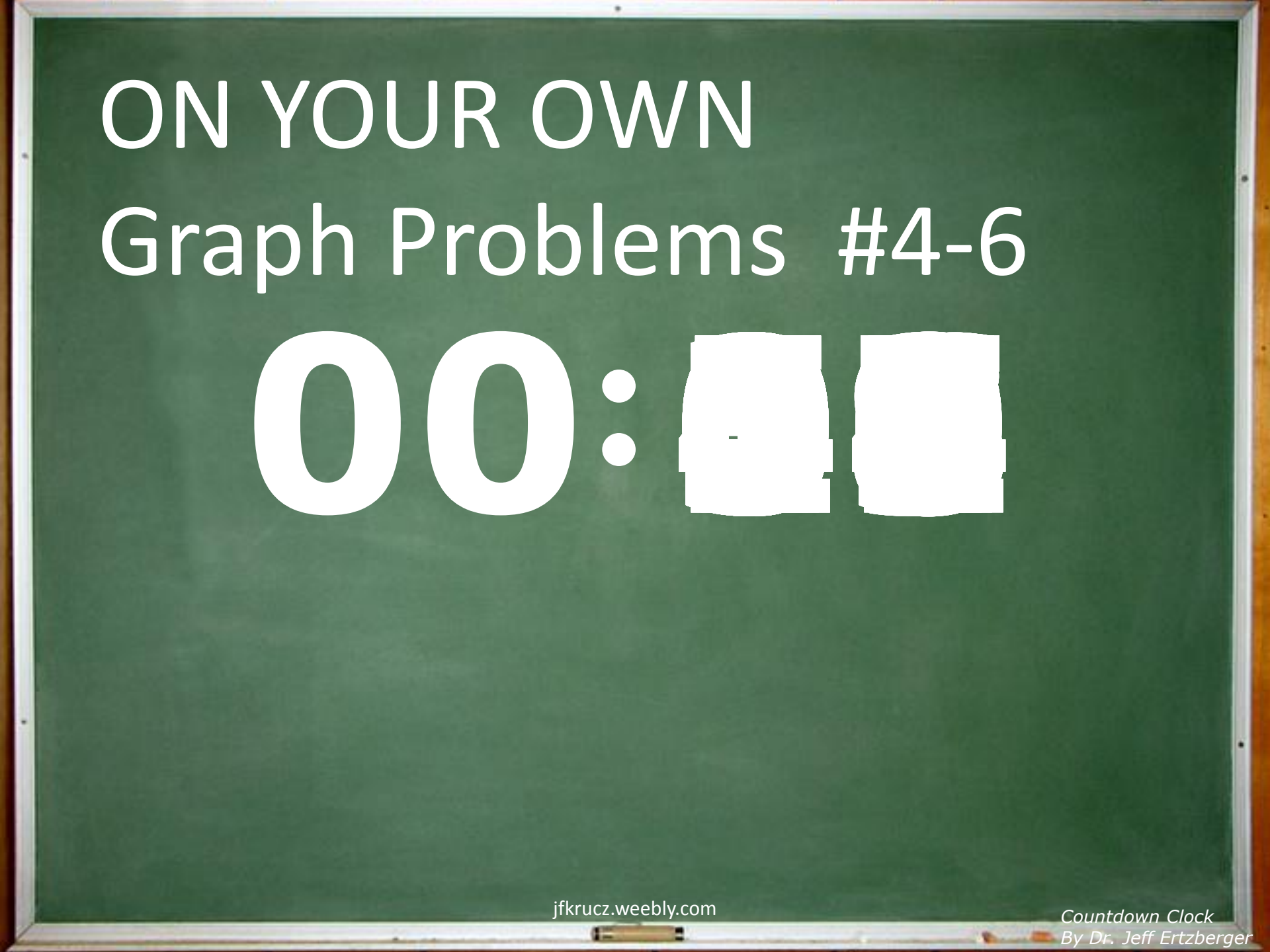
ON YOUR OWN
Graph Problems #4-6



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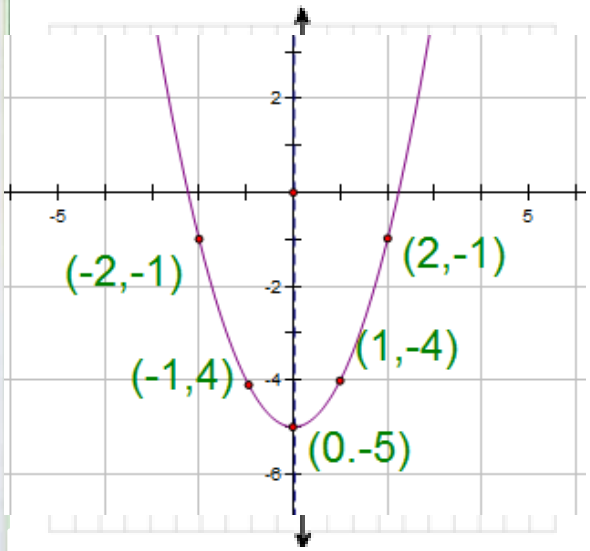
- THANK YOU!

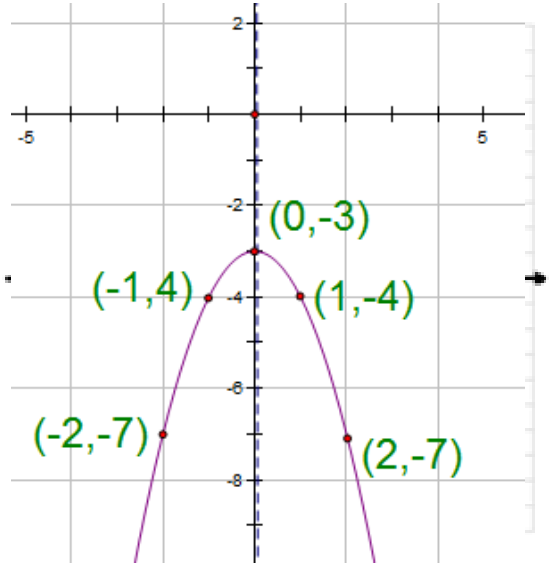
On Your Own..Graph the following:

4. $f(x) = x^2 - 5$



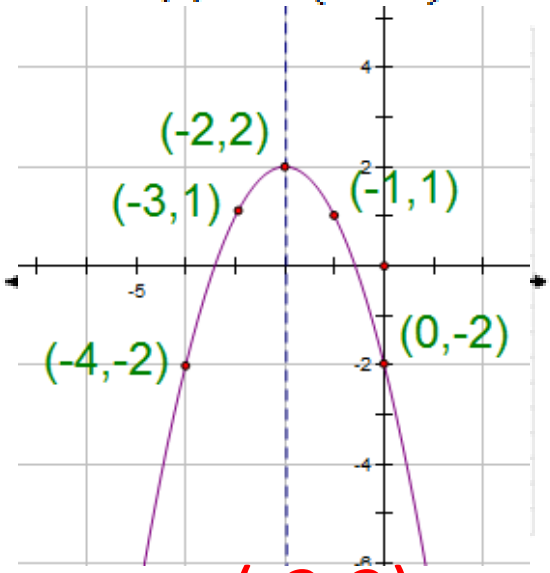
VERTEX: (0,-5)
AXIS of SYM: x = 0
OPENS: up
Min or Max: min
Domain: All Reals
Range: y ≥ -5

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



VERTEX: (0,-3)
AXIS of SYM: x = 0
OPENS: down
Min or Max: max
Domain: All Reals
Range: y ≤ -3

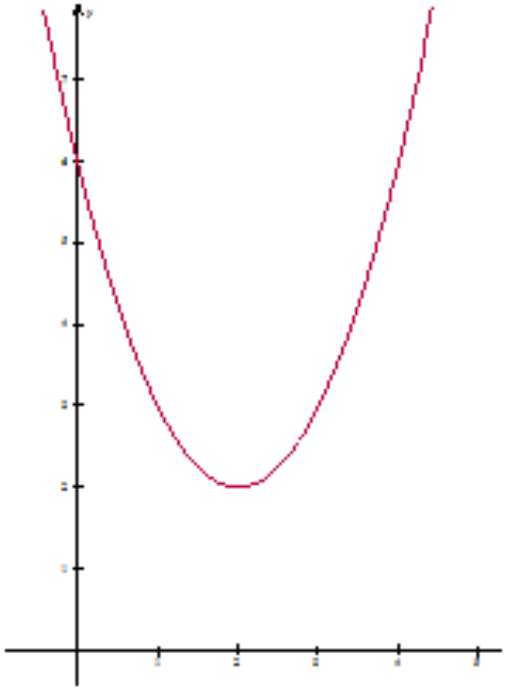
6. $f(x) = -(x+2)^2 + 2$



VERTEX: (-2,2)
AXIS of SYM: x = -2
OPENS: down
Min or Max: max
Domain: All Reals
Range: y ≤ 2

Finding the y-intercepts of a Quadratic Function

- Below is the graph for $f(x) = (x-2)^2 + 2$



a) State the Vertex: (2 , 2)

b) Locate and state the y-intercept: (0 , 6)

c) How can we find the y-intercept without using a graph? [Hint: What is the x-coordinate of the y-intercept?]

We can set x equal to zero!!!

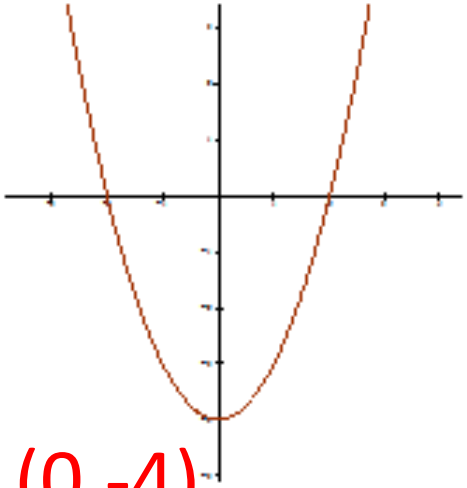
Finding the x-intercepts of a Quadratic Function

For the following graphs answer the following questions

a) State the Vertex

b) Locate and state the x-intercept(s)

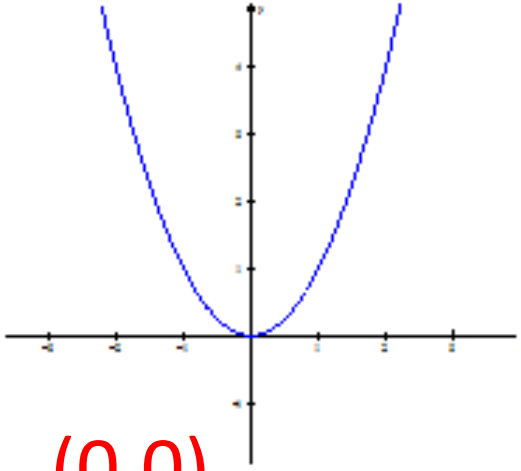
1. $f(x) = x^2 - 4$



a) (0,-4)

b) (2,0) and (-2,0)

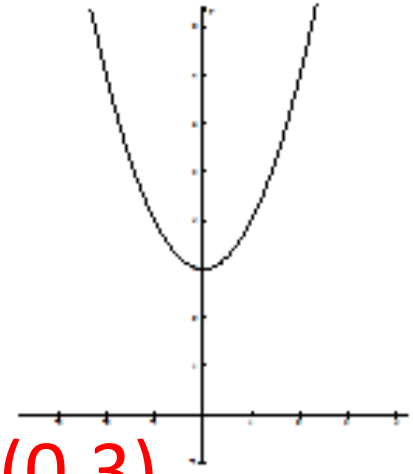
2. $f(x) = x^2$



a) (0,0)

b) (0,0)

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



a) (0,3)

b) none

HOMEWORK

- DAY 2 HOMEWORK [ODDS ONLY]
- Mini-Quiz Next Class
  - ❑Graphing Absolute Values
    - ❑Stating Vertex/ Axis of Symmetry/ opening up or down
  - ❑Graphing Quadratics
    - ❑Stating Vertex/ Axis of Symmetry/ opening up or down