Label what a = ___ b = ___and c = ___

Sketch the graph of each function.

1) $y = 2x^2 + 12x + 17$

a: 2
b: 12
c: 17

2) $y = 2x^2 + 8x + 10$

a: 2
b: 8
c: 10

3) $y = x^2 + 4x + 6$

a: 1
b: 4
c: 6

4) $y = -\frac{1}{2}x^2 + 4x - 4$

a: -1/2
b: 4
c: -4

$2x^2 + 10x - 3$

$\frac{-b}{2a} = \frac{-10}{4} = -\frac{5}{2}$

$x^2 + 8x - 1$

$-b/2a = -8/2 = -4$

$y = x^2 + 8x - 1$

$= -4$

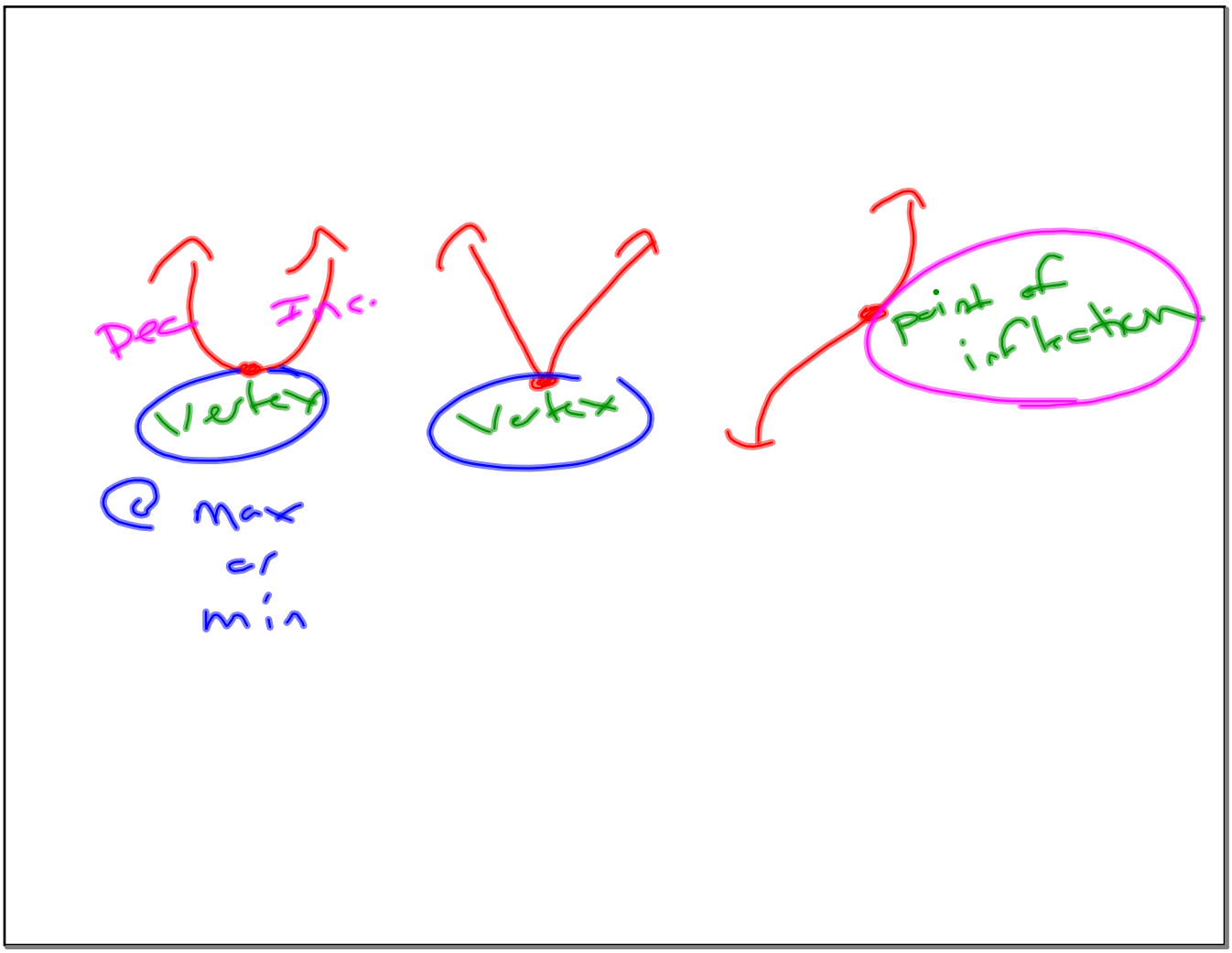
$= 16 - 32 - 1$

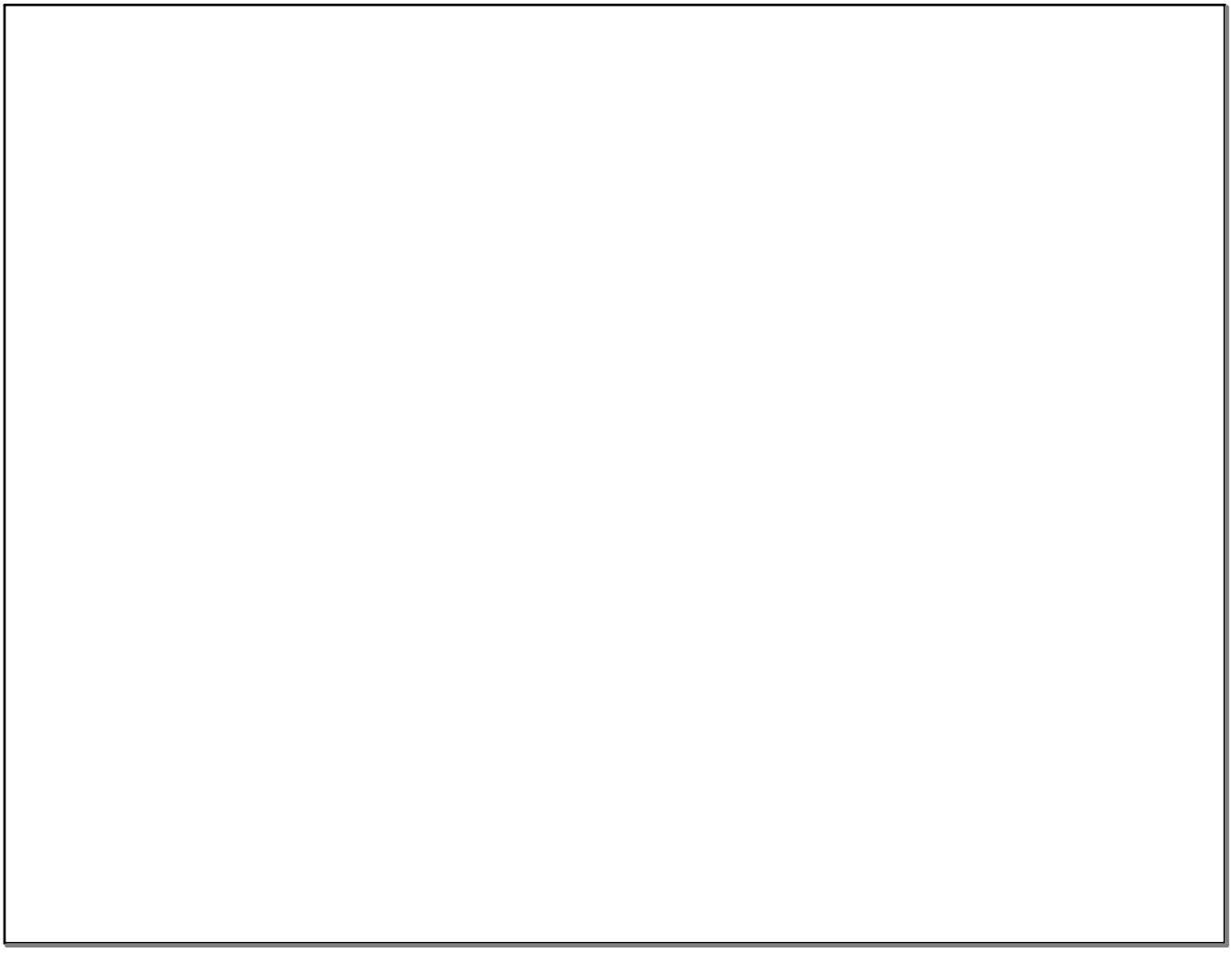
$= 16 - 33$

$= -17$

$(-4, -17)$

vertex

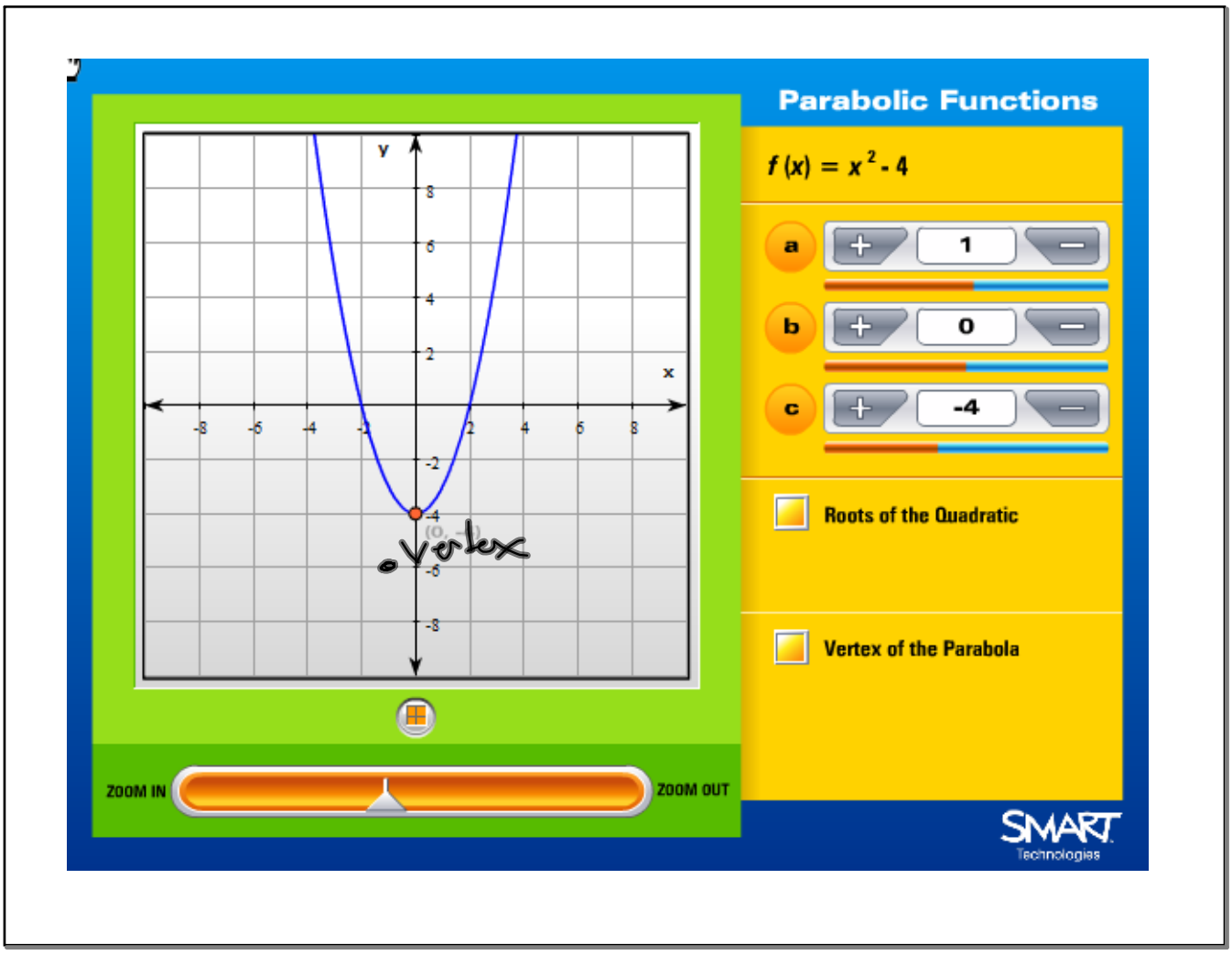

Dec
Inc.
Vertex
Vertex
point of inflection
max
or
min



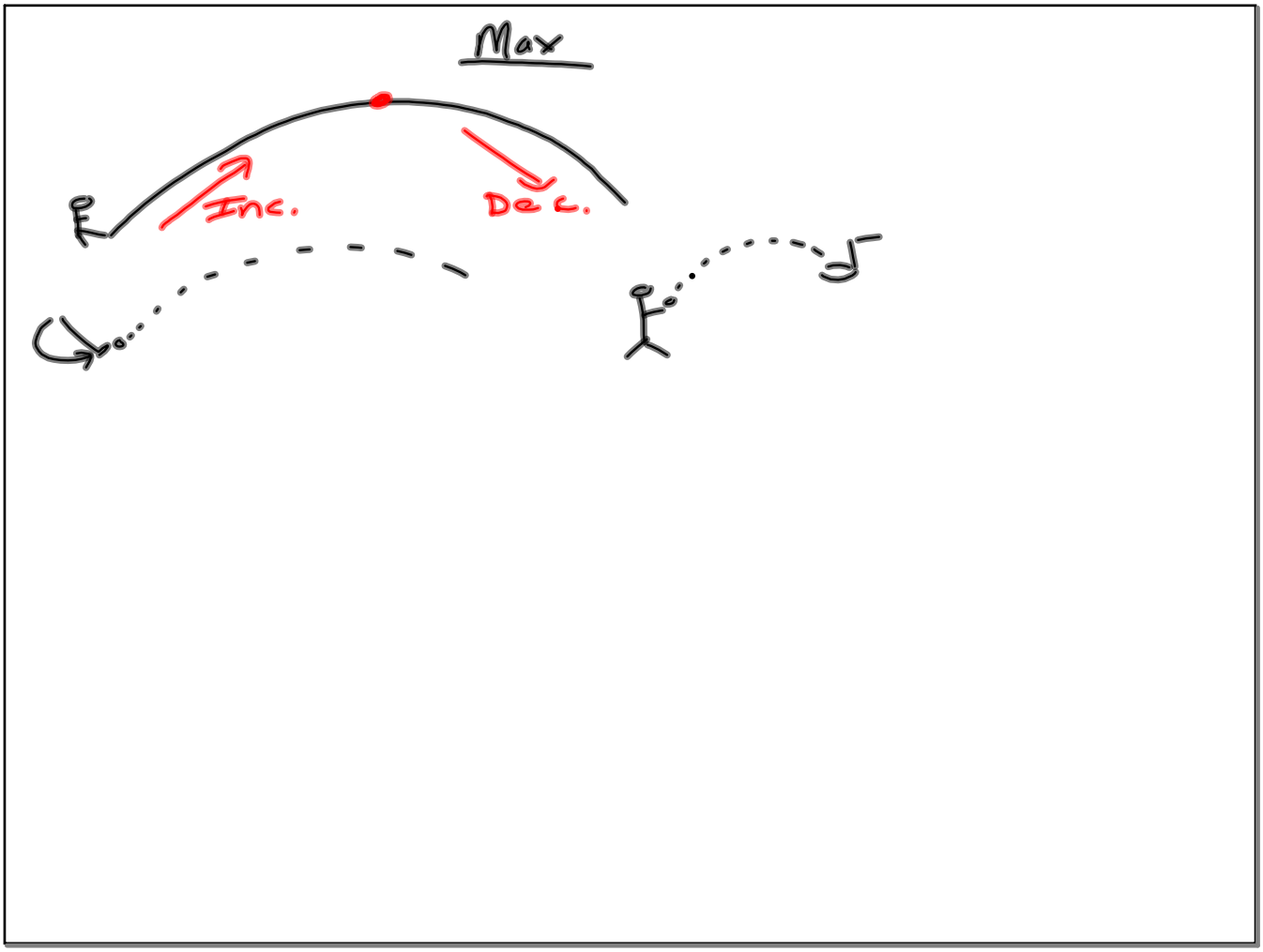
White Board Activity ...

Need: 1 white board per person
1 dry eraser marker & eraser

Graph Quadratic Functions through transformations ....


Parabolic Functions
f (x) = x 2 - 4
a
1
b
0
c
-4
Roots of the Quadratic
Vertex of the Parabola
y
x
Vertex
ZOOM IN
ZOOM OUT
SMART
Technologies

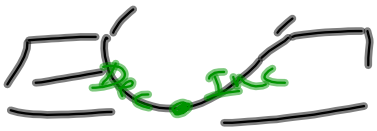
Jan 24-8:32 AM


Max
Inc.
Dec.

Min

Real world

Banking Stocks

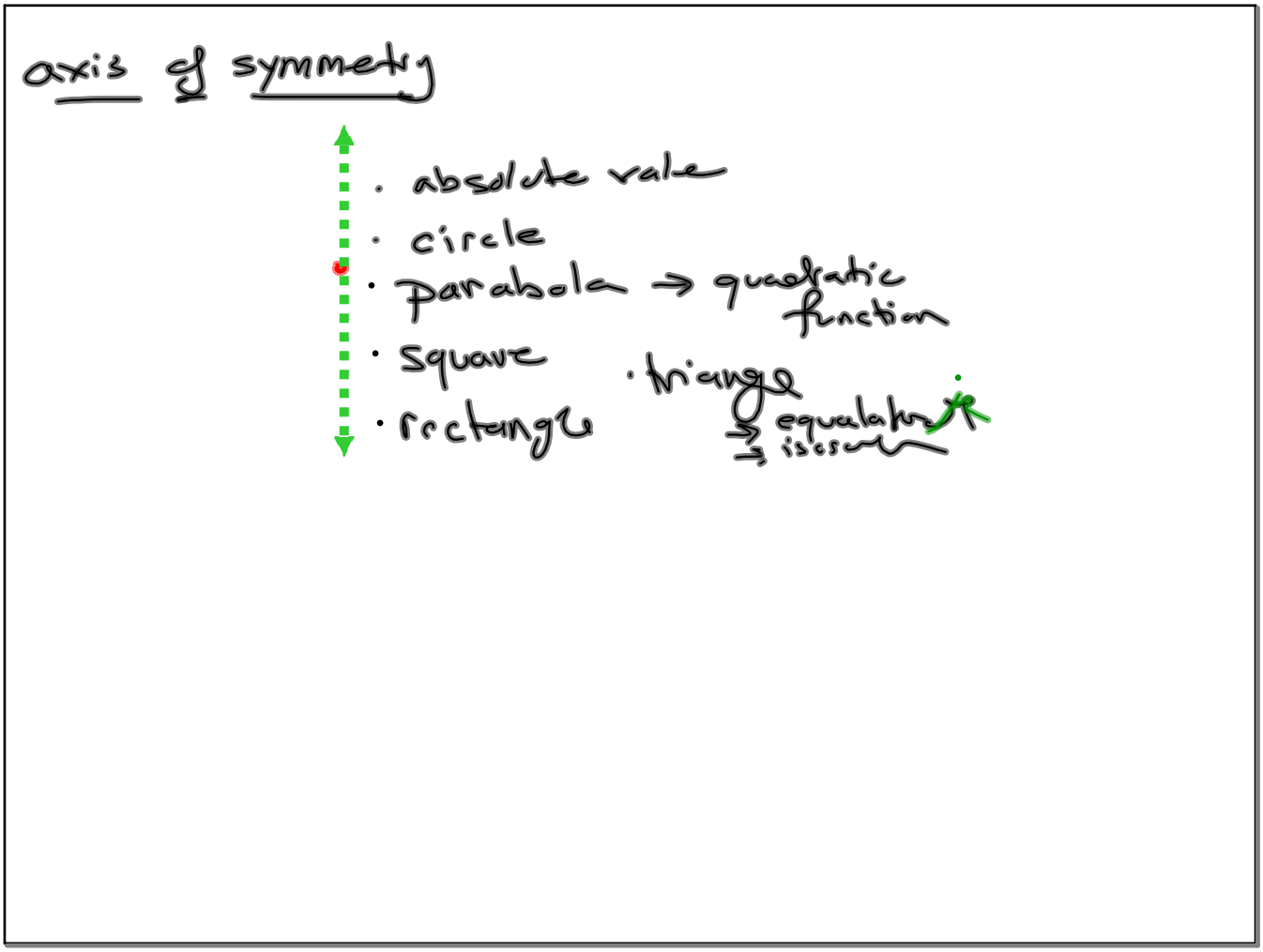


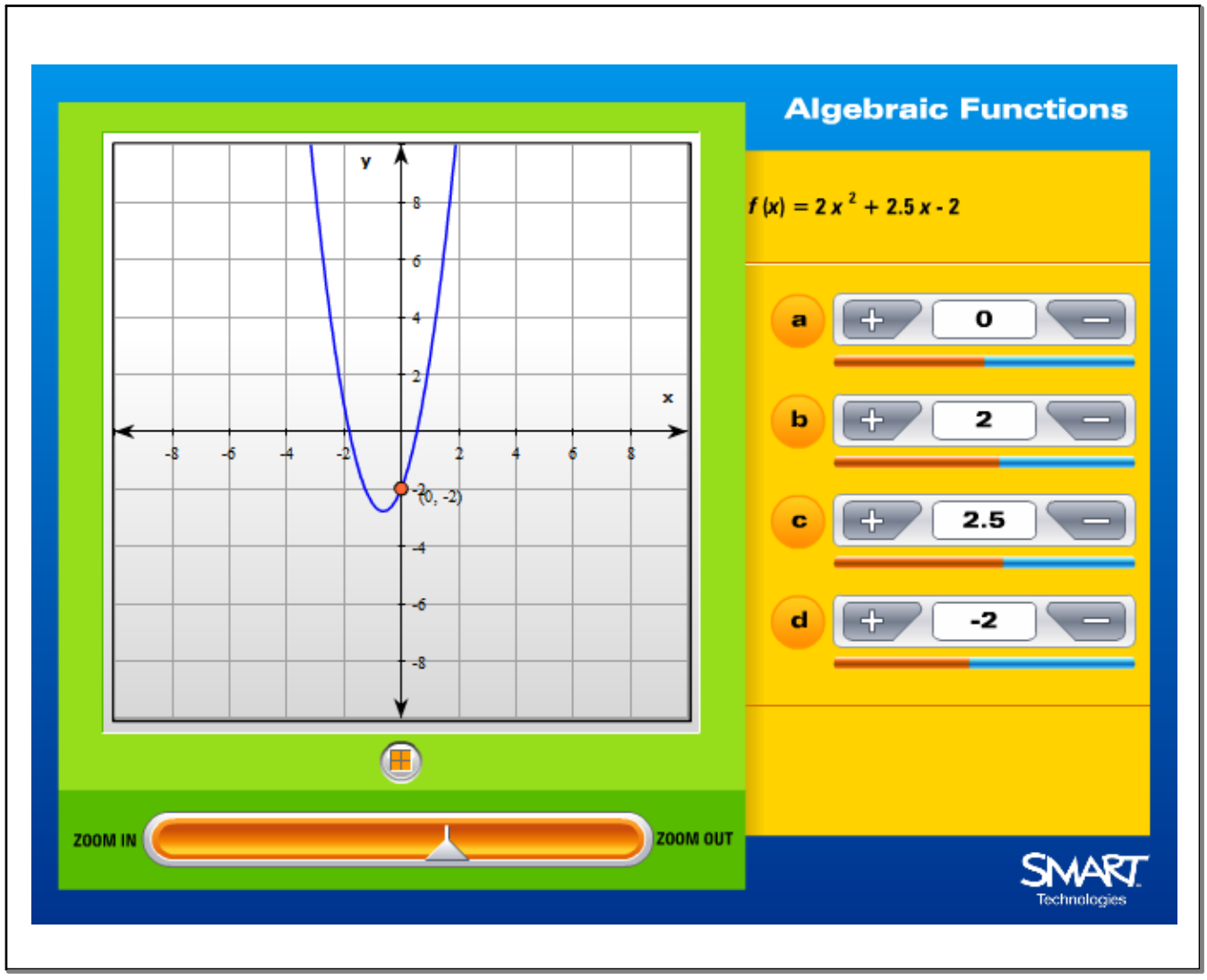
Notes :

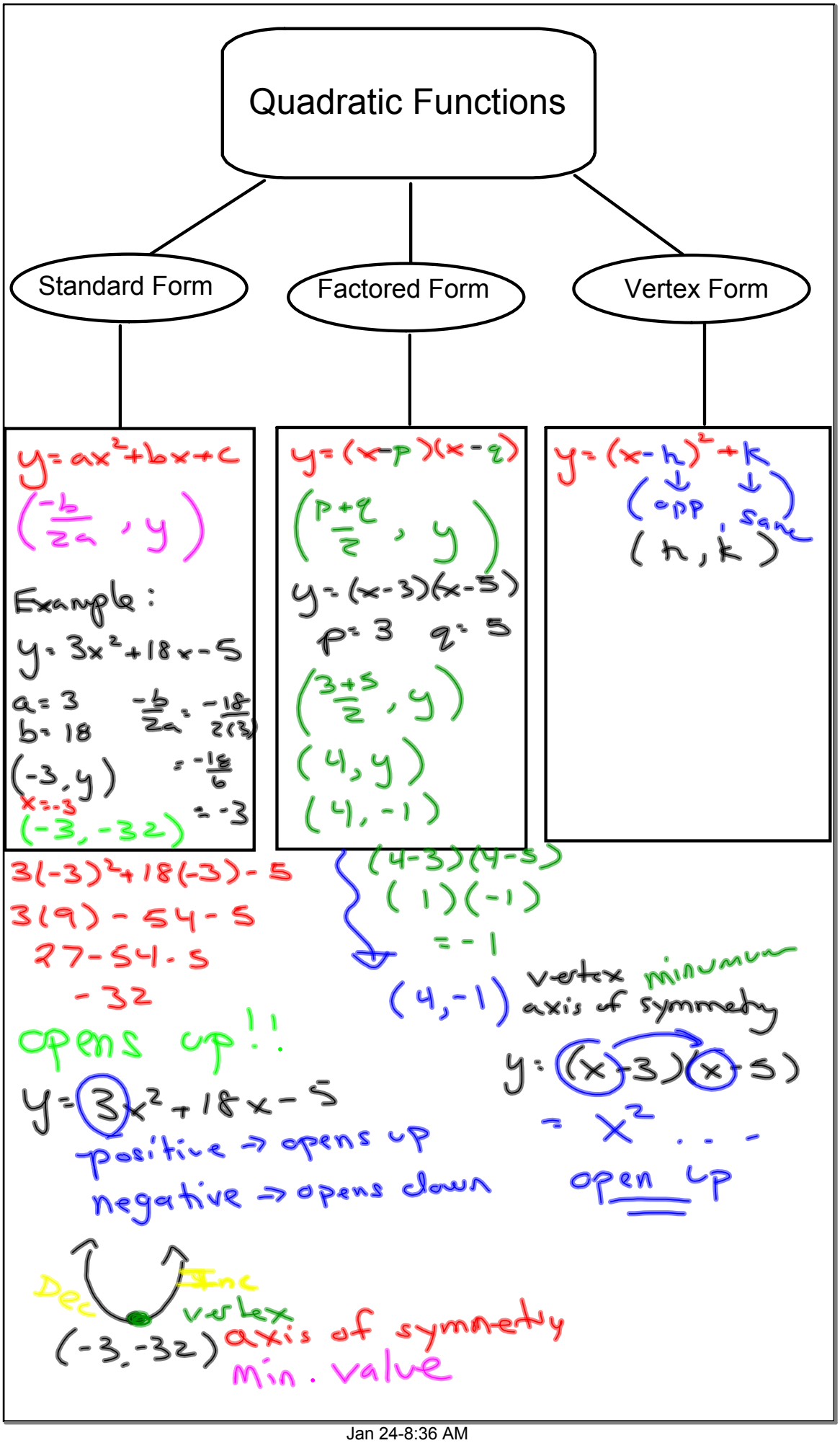
Vertex : the point where a graph changes from increasing to decreasing or decreasing to increasing

at the point of a maximum or minimum value

the point on a parabola where the axis of symmetry lies.


axis of symmetry
absolute value
circle
parabola → quadratic function
square
triangle
rectangle


Algebraic Functions
f (x) = 2 x 2 + 2.5 x - 2
a
0
b
2
c
2.5
d
-2
y
x
(0, -2)
ZOOM IN
ZOOM OUT
SMART
Technologies


Quadratic Functions
Standard Form
Factored Form
Vertex Form
$y = ax^2 + bx + c$
$\left(\frac{-b}{2a}, y\right)$
Example:
$y = 3x^2 + 18x - 5$
$a = 3$
$b = 18$
$\frac{-b}{2a} = \frac{-18}{2(3)}$
$= \frac{-18}{6}$
$= -3$
$(-3, y)$
$x = -3$
$(-3, -32)$
$3(-3)^2 + 18(-3) - 5$
$3(9) - 54 - 5$
$27 - 54 - 5$
-32
opens up!!
$y = 3x^2 + 18x - 5$
positive → opens up
negative → opens down
Dec
Inc
vertex
$(-3, -32)$
axis of symmetry
min. value
$y = (x - p)(x - q)$
$\left(\frac{p+q}{2}, y\right)$
$y = (x-3)(x-5)$
$p = 3$ $q = 5$
$\left(\frac{3+5}{2}, y\right)$
$(4, y)$
$(4, -1)$
$(4-3)(4-5)$
$(1)(-1)$
$= -1$
$(4, -1)$
vertex minimum
axis of symmetry
$y = (x-3)(x-5)$
$= x^2 \ldots$
open up
$y = (x - h)^2 + k$
opp
same
(h, k)

Find the vertex of each function

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

2) $y = x^2 + 8x + 13$

3) $y = 2x^2 + 16x + 33$

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

5) $y = \frac{1}{2}x^2 + 4x + 9$

6) $y = 2x^2 + 8x + 7$

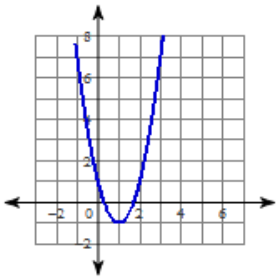
7) $y = 2x^2 + 12x + 20$

8) $y = -x^2 + 8x - 18$

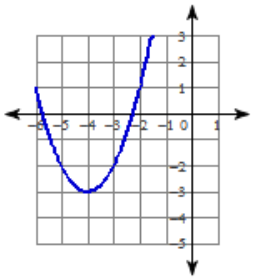
9) $y = x^2 - 8x + 17$

10) $y = 2x^2 - 8x + 11$

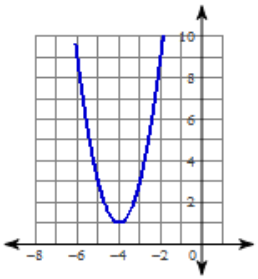
1)



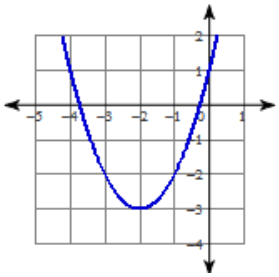
2)



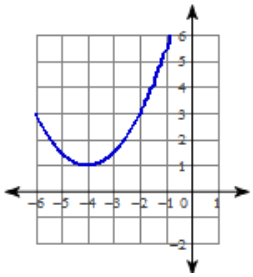
3)



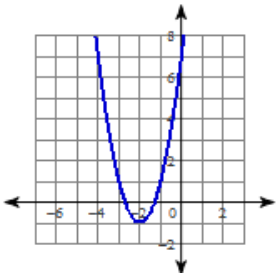
4)



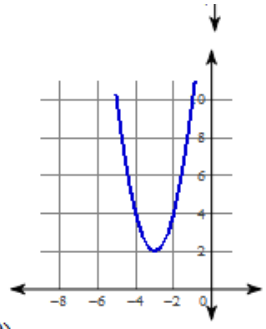
5)



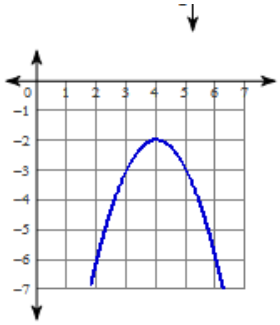
6)



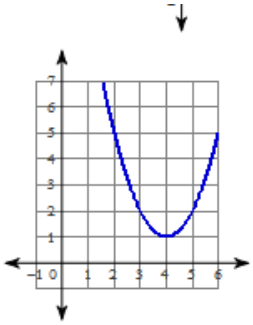
7)



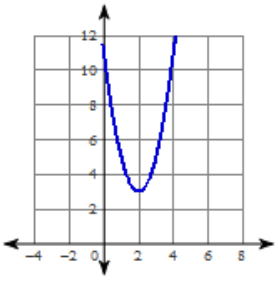
8)



9)



10)



What does it mean to be "factored" ?

Where do you plot factors on a graph?

So where would the vertex of the graph be plotted?

Find the vertex of each function below:

11) $y=(x+3)^2+2$

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

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

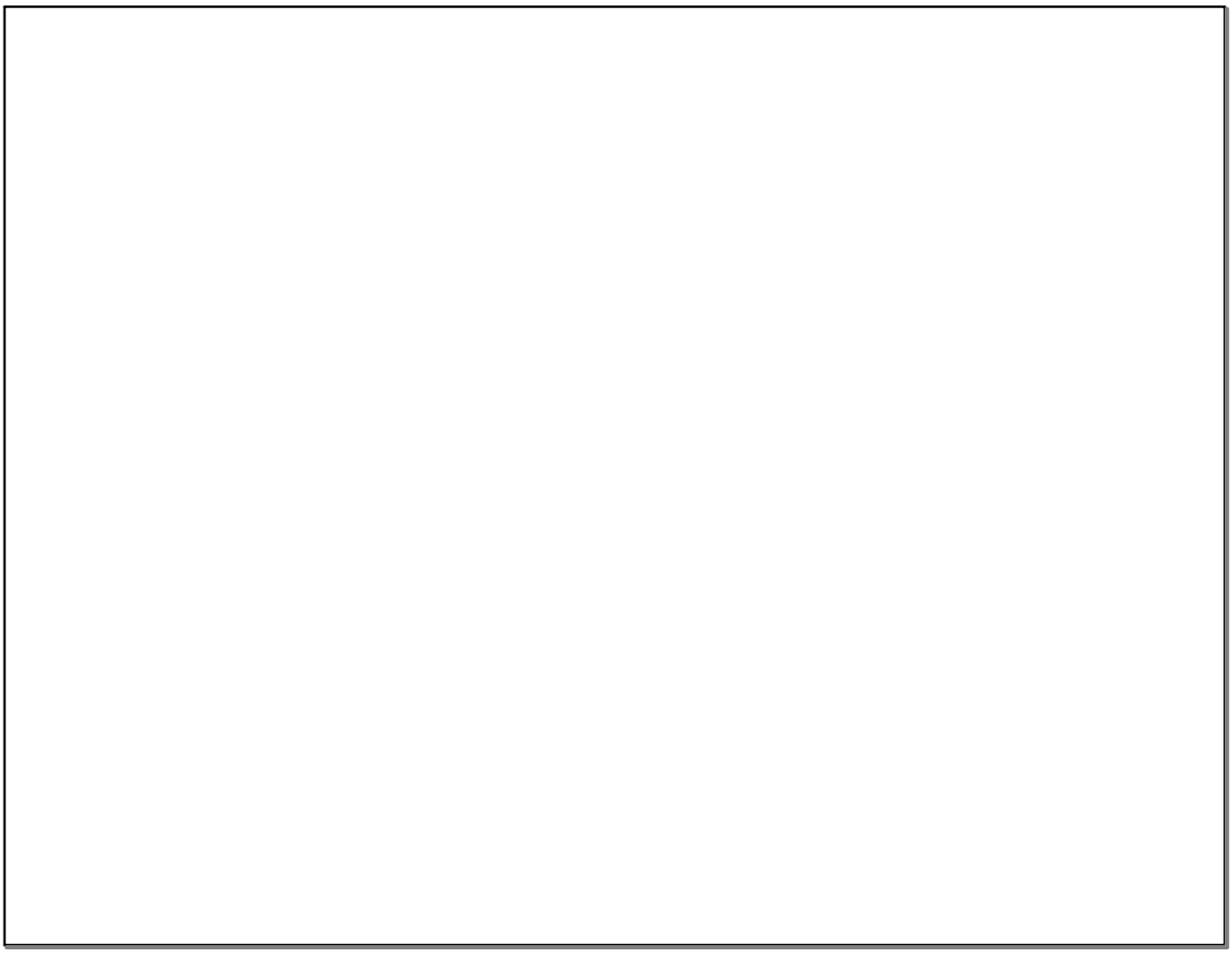
16) $y=(x+4)^2+1$

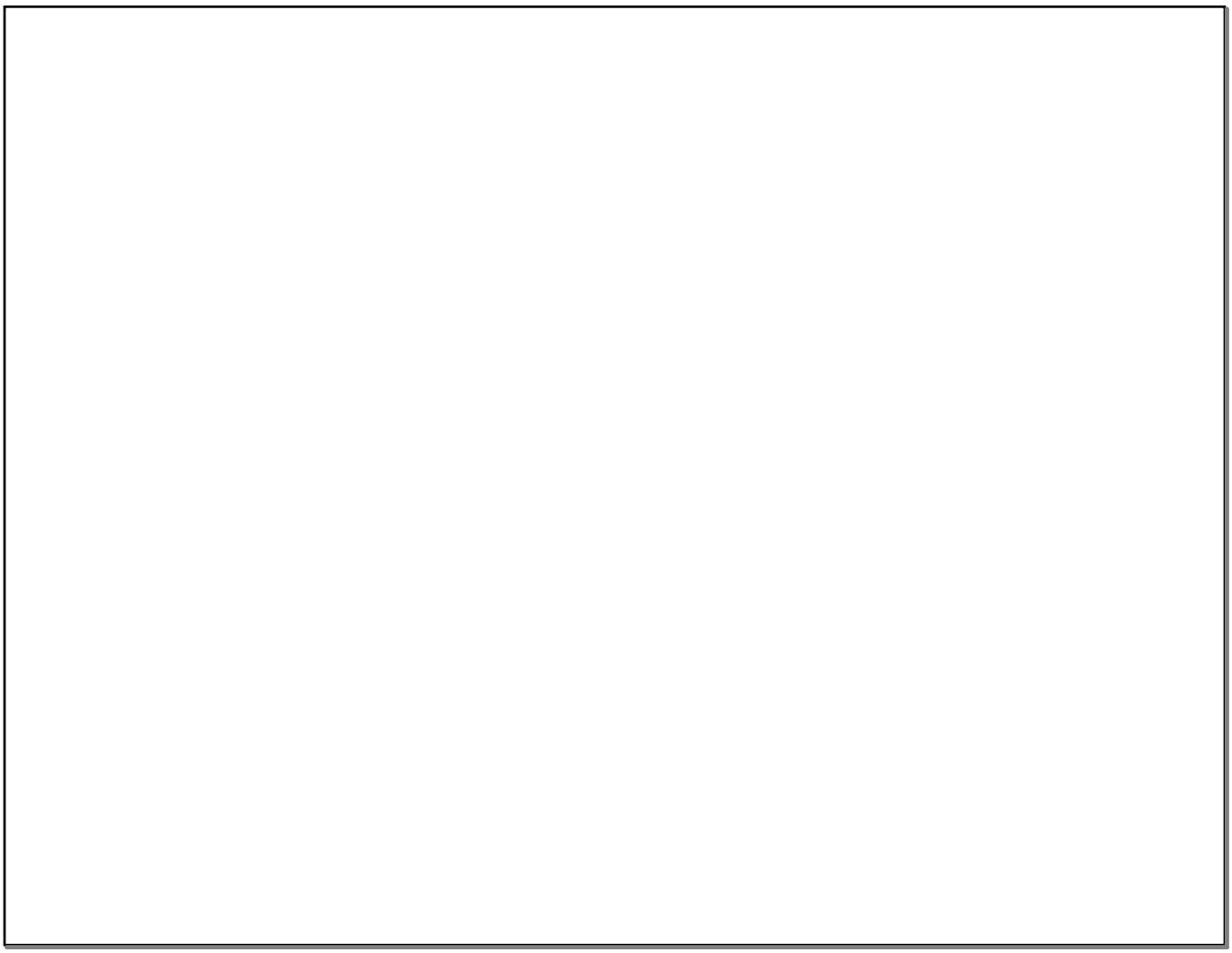
13) $y=(x-4)^2-4$

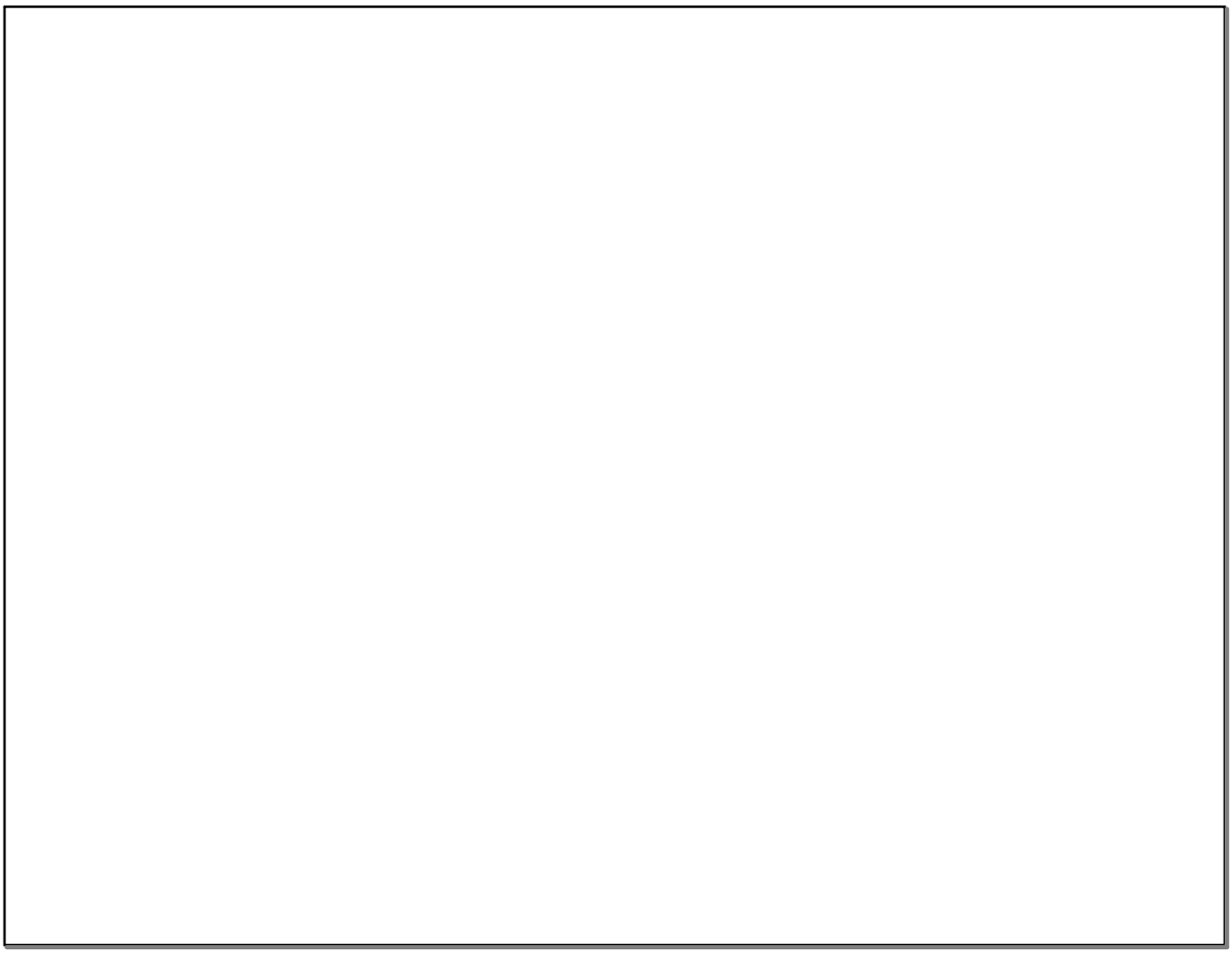
14) $y=(x-3)^2+4$

17) $y=(x+2)^2+3$

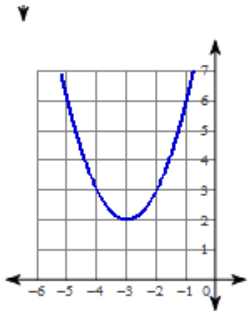
18) $y=(x-2)^2-4$



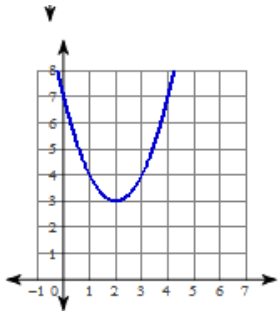




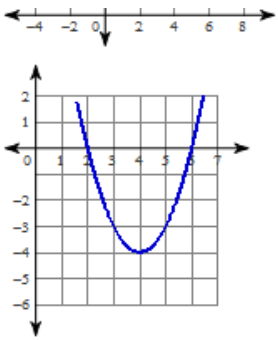
11)



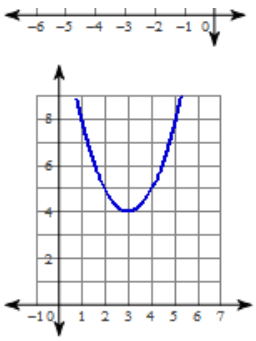
12)



13)



14)



15)