Graphing Parabolas

We will have to graph parabolas quite often in calculus. Some parabolas curve up or down and some curve left or right. The ones that curve up or down are functions since they pass the vertical line test while the sideways parabolas are not functions. When we graph parabolas it will be necessary to locate the vertex and the x- and y-intecepts. Other points on the parabolas may also be important.

Usually our parabolas will be given in $y \quad ax^2 \quad bx \quad c$ form. If we have one in this form, then we simply transform it into "vertex form" $y \quad k \quad a\ x \quad h\ ^2$ The vertex will then be the ordered pair h,k . Here is an example.

Graph the parabola $y \quad 2x^2 \quad 12x \quad 5$

$y \quad 2x^2 \quad 12x \quad 5$

$y \quad 5 \quad 2x^2 \quad 12x$

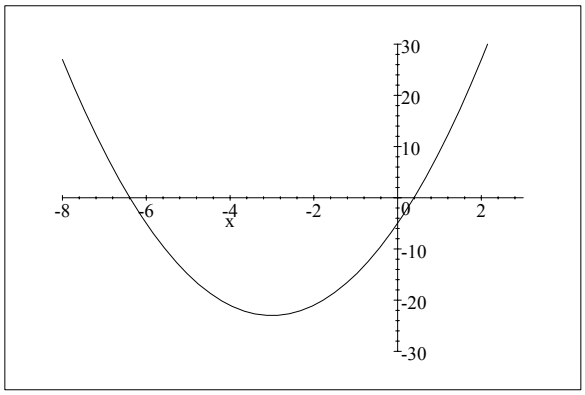
$y \quad 5 \quad 2\ x^2 \quad 6x$

$y \quad 5 \quad 18 \quad 2\ x^2 \quad 6x \quad 9$

$y \quad 23 \quad 2\ x \quad 3\ ^2$

$y \quad 23 \quad 2\ x \quad 3\ ^2$

So, the vertex is $3, \ 23$



$y \quad 2x^2 \quad 12x \quad 5$

The y-intercept is $0, \ 5$. That's easy to find. Just plug 0 in for x in the equation $y \quad 2x^2 \quad 12x \quad 5$, and solve for y.

The x-intercepts can be found by solving the quadratic equation $2x^2 \quad 12x \quad 5 \quad 0$ with the quadratic formula. I got approximately $.3912$ and 6.3912

Sideways parabolas should be transformed to the form $x \quad h \quad a\ y \quad k\ ^2$. Again the vertex will be h,k . We will practice graphing parabolas in class.