Converting to vertex form

- $y = 2x^2 - 3x + 4$ $\quad a=2 \quad b=-3 \quad c=4$
- h=$\frac{-b}{2a}$
- To find K plug in h for x in the standard form, k is the y

vertex (h, K) $\qquad\qquad (\frac{3}{4}, ?)$

- $h = -\frac{b}{2a} = \frac{3}{2\cdot 2} = \frac{3}{4}$

$2x^2 - 3x + 4$

$2\left(\frac{3}{4}\right)^2 - 3\left(\frac{3}{4}\right) + 4$

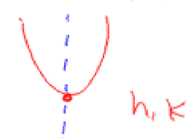
$= \cancel{2}\cdot\frac{9}{\cancel{16}\,8} - \frac{9\cdot 2}{4\cdot 2} + \frac{4\cdot 8}{1\cdot 8}$

$= \frac{9 - 18 + 32}{8} = \frac{23}{8} \leftarrow K.$

vertex $\left(\frac{3}{4}, \frac{23}{8}\right)$

axis of symmetry $\quad x = h$

$x = \frac{3}{4}$



Vertex form:

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

$\downarrow$ same as "a" in standard form

$= 2\left(x - \frac{3}{4}\right)^2 + \frac{23}{8}$

Write the following function in vertex form

- $f(x) = 6x - 3x^2 - 5$

$f(x) = -3x^2 + 6x - 5$

$a = -3 \quad b = 6 \quad c = -5$

(h, k)

$(1, ?)$

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

$-3(1)^2 + 6(1) - 5$

$h = \frac{-6}{2(-3)}$

$-3 + 6 - 5 = -2$

$(1, -2)$

$h = \frac{-6}{-6} = \boxed{1}$

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

$f(x) \boxed{= -3(x-1)^2 - 2}$

$\boxed{x = 1}$ axis of symmetry.

To describe the graph of a Quadratic Function

- Vertex (h,K)
- Axis of the parabola (axis of symmetry) x=h
- Parabola opens upward (a>0) parabola opens downward (a<0)
- Initial value (y intercept) : f(0)=c
- X intercepts (quadratic formula)

- $f(x) = 6x - 3x^2 - 5$

$f(x) = -3(x-1)^2 - 2$

- vertex $(1,-2)$
- axis of symmetry $x=h$ $x=1$
- ∪ ∩ ? downwad $a<0$
- y-int -5 (c from the standard form)
- x-int

$f(x) = -3x^2 + 6x - 5$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{-6 \pm \sqrt{36-4(-3)(-5)}}{-6}$$

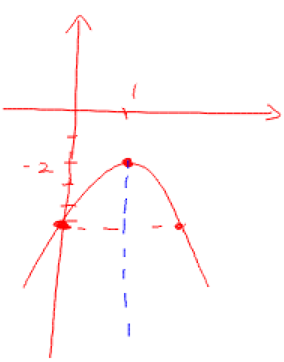
$$= \frac{-6 \pm \sqrt{-24}}{-6} = \frac{-6 \pm \sqrt{4 \cdot 6i}}{-6}$$

$$\frac{\cancel{-6} \pm \sqrt{-24}}{\cancel{-6}}$$

$$\frac{8+\cancel{2}}{\cancel{2}} = \cancel{8}$$

$$= \frac{-6 \div 2 \pm 2 \div 2\sqrt{6i}}{-6 \div 2}$$

$$= \boxed{\frac{-3 \pm \sqrt{6}\,i}{-3}}$$



No real Solutions

the parabola does not cross the X-axis.