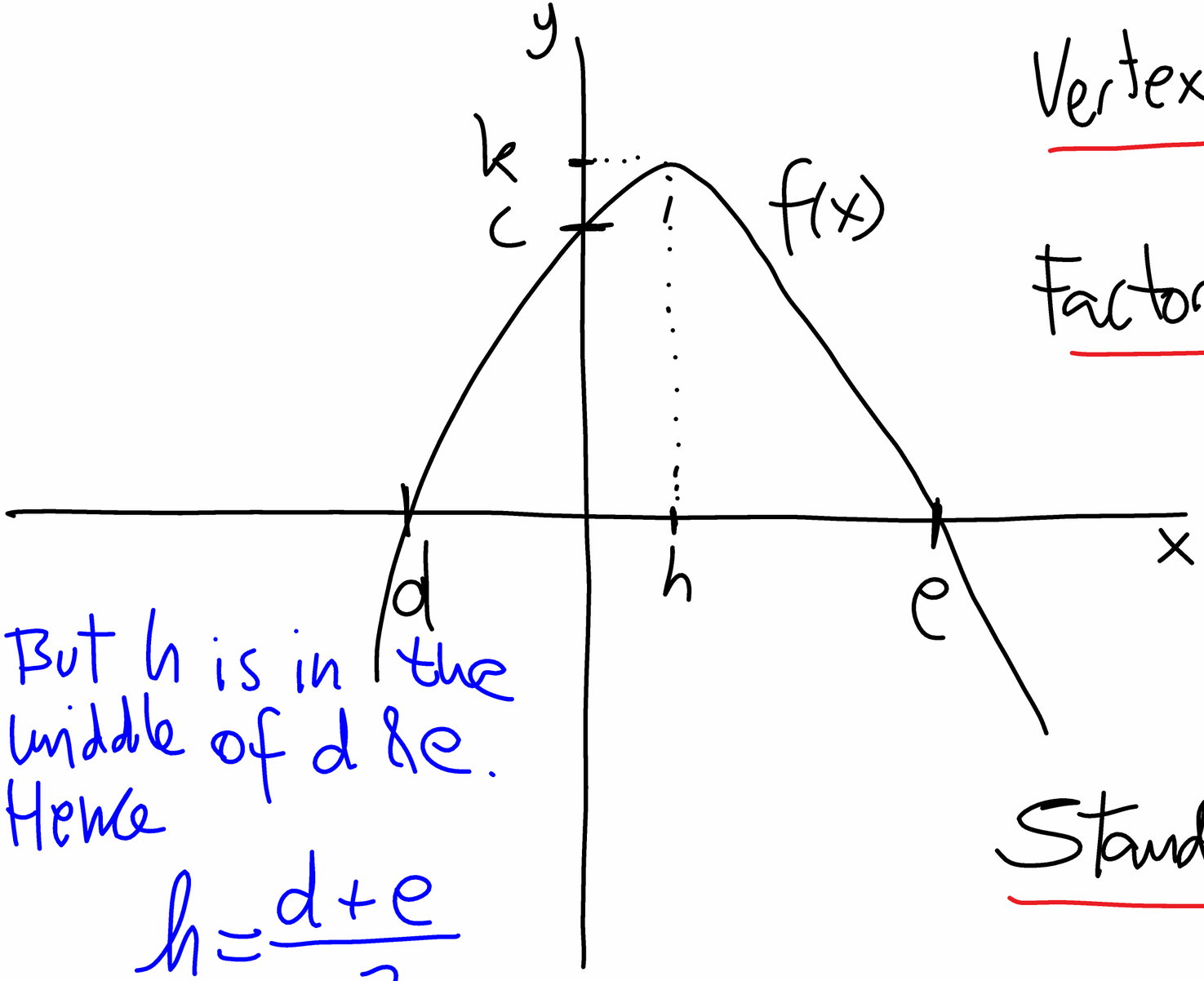
QUADRATICS CHEATSHEET

Thu 7 MAR 2019

STANDARD FORM : $f(x) = ax^2 + bx + c$

FACTOR FORM : $f(x) = a(x-d)(x-e)$

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



Vertex form: $a(x-h)^2+k$

Factor form: $a(x-d)(x-e)$

d, e:
- zeros of $f(x)$
- x-intercepts of $f(x)$

Standard form: ax^2+bx+c

c: y-intercept

But h is in the middle of d & e.
Hence

$$h = \frac{d+e}{2}$$

$\therefore$

RELATIONS BETWEEN THE DIFFERENT FORMS

FROM STANDARD → FACTOR FORM

$$f(x) = ax^2 + bx + c = a(x-d)(x-e) = ax^2 - a(d+e)x + ade$$

(b = $-a(d+e)$, c = ade)

d & e are the two solutions of the quadratic equation

$$f(x) = 0 \iff ax^2 + bx + c = 0 \longrightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

($+$ → $= d$, $-$ → $= e$)

FROM FACTOR F → STANDARD F.

Just multiply the 2 factors

FROM VERTEX FORM TO STANDARD FORM

$$f(x) = a(x-h)^2 + k \quad == \quad ax^2 + bx + c$$

How?

Expand the Vertex form

Example

$$f(x) = \underbrace{3(x+7)^2 - 3}_{\text{V Form}} = 3\left[x^2 + 2\cdot 7 \cdot x + 7^2\right] - 3 =$$

$$= \underbrace{3x^2 + 42x + 49}_{\text{S FORM}} \qquad a=3 \quad b=42 \quad c=49$$