FROM STANDARD FORM TO FACTOR FORM (METHOD 2)

Tue 19 FEB 2019

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

HOW?

Ans: Find the zeros of $f(x)$

FF: $f(x) = a(x-d)(x-e)$

x-intercept aka zeros $\leftarrow$ $f(e) = 0$ $\quad f(d) = a(d-d)(d-e) = 0$

Ex: Express this in FF: $f(x) = (2-x)(x+3)$

Ans: $f(x) = [-(x-2)](x+3) = \boxed{-(x-2)(x+3)}$

$$f(x) = 3(x-5)(x-7)$$

$$f(5) \stackrel{?}{=} 3(5-5)(5-7) =$$

$$= 3 \cdot 0 \cdot (-2) = 0$$

$$f(7) = 3(7-5)(7-7) = 0$$

FINDING ZEROS WHEN IN STANDARD FORM

GENERAL METHOD

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

The zeros are given by the quadratic formula!

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Example $f(x) = 2x^2 + 5x - 3$ Write it in FF

Ans: Let's first find the zeros $f(x) = 0$

$$2x^2 + 5x - 3 = 0$$

$$x = \frac{-5 \pm \sqrt{5^2 - 4 \cdot 2 \cdot (-3)}}{2 \cdot 2} = \frac{-5 \pm \sqrt{25 + 24}}{4} = \frac{-5 \pm \sqrt{49}}{4} = \frac{-5 \pm 7}{4} = \begin{cases} + & \frac{2}{4} = \boxed{\frac{1}{2}} \\ - & \frac{-12}{4} = \boxed{-3} \end{cases}$$

Hence the FF is

$$\boxed{f(x) = 2\left(x - \frac{1}{2}\right)\left(x - (-3)\right)}$$

$$= 2\left(x - \frac{1}{2}\right)(x + 3)$$

(In class) Write in factor form $f(x) = 4x^2 - 19x + 12$

Ans: 1st) General form of Quadratic expression/function

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

2nd) Quadratic formula $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

3rd) General factor form $f(x) = a(x-d)(x-e)$

4) Find zeros $f(x) = 0$: $4x^2 - 19x + 12 = 0 \rightarrow x = \dfrac{19 \pm \sqrt{19^2 - 4 \cdot 4 \cdot 12}}{2 \cdot 4} =$

$$x = \frac{19 \pm \sqrt{361 - 192}}{8} = \frac{19 \pm \sqrt{169}}{8} = \frac{19 \pm 13}{8} = \frac{32}{8} = 4, \quad \frac{6}{8} = 3/4$$

$\cancel{4}\left(-\frac{3x}{\cancel{4}}\right)$

Hence, the FF:

$$\boxed{f(x) = 4\left(x - \frac{3}{4}\right)(x-4)}$$