9.3 Complex Zeros

- I can find all complex zeros when given a real zero
- I can use synthetic division to find complex zero

Find all zeros given one real zero

$$f(x) = 3x^3 - 17x^2 + 33x - 22;\ 2$$

2	3	−17	33	−22
	↓	6	−22	22
	3	−11	11	0

R

$3x^2 - 11x + 11$

$a = 3$

$b = -11$

$c = 11$

$$\frac{11 \pm \sqrt{121 - 132}}{6}$$

$\sqrt{-11}$

$2, \frac{11 + i\sqrt{11}}{6}, \frac{11 - i\sqrt{11}}{6}$

Find all zeros given one real zero

$$f(x) = 3x^3 + 16x^2 + 9x - 36;\ -3$$

$-3 \mid 3 \quad 16 \quad 9 \quad -36$

$3x^2 + 7x - 12$

Zeros: $-3, \dfrac{-7 \pm i\sqrt{95}}{6}$

$(x+3)(x+\ \ )(x-\ \ )$

Write a 2nd degree polynomial in factored form with the following zeros

$$1+2i, 1-2i$$

$(x-(1+2i))(x-(1-2i))$

$(x-1-2i)$

$2, -2$

$(x-2)(x+2)$

Write a 3rd degree polynomial in factored form with the following zeros

$1, 3i, -3i$

$(x-1)(x-3i)(x+3i)$

Write a 3rd degree polynomial in factored form with the following zeros

$-2, 1+2i$, $1-2i$