

## 4.3 mini lecture

- ① degree 6, real # coefficients,  
zeros at  $-3, 1, 3-i, -4+i$

$$(x+3)(x-1)(x-(3-i))(x-(-4+i))(x-(3+i))(x-(-4-i))$$

Use conjugate

- ② degree 4, real # coefficients,  
zeros at  $-1, 2, -2i$

$$* i^2 = -1 *$$

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

$$(x^2-x-2)(x^2+4)$$

$$x^4+4x^2-x^3-4x-2x^2-8$$

$$x^4 - x^3 + 2x^2 - 4x - 8$$

### 4.3 mini lecture

③  $x^3 - 3x^2 - 15x + 125$  zero at  $4+3i$

$(x - (4+3i))(x - (4-3i))$  conjugate

$$x^2 - 4x + 3ix - 4x - 3ix + 16 + 9$$

$$x^2 - 8x + 25$$

$$\begin{array}{r} x+5 \\ x^2-8x+25 \overline{) x^3-3x^2-15x+125} \\ \underline{-x^3+8x^2+25x} \quad (\text{change signs}) \\ 5x^2-40x+125 \\ \underline{-5x^2+40x-125} \quad (\text{change signs}) \\ 0 \end{array}$$

$$(x - (4+3i))(x - (4-3i))(x+5)$$

Zeros at

|        |
|--------|
| $4-3i$ |
| $-5$   |
| $4+3i$ |

### 4.3 min: lecture

$$\textcircled{4} \quad 4x^4 - x^3 + 5x^2 - 2x - 6$$

rational  
possible zeros

$$\pm 1, \pm 2, \pm 3, \pm 6$$

$$\pm 1, \pm 2, \pm 4$$

$$\begin{array}{r|rrrrr} 1 & 4 & -1 & 5 & -2 & -6 \\ & \downarrow & & & & \\ \hline & 4 & 3 & 8 & 6 & \boxed{0} \checkmark \end{array}$$

$$4x^3 + 3x^2 + 8x + 6$$

possible rational  
zeros

$$\pm 1, \pm 2, \pm 3, \pm 6$$

$$\pm 1, \pm 2, \pm 4$$

$$\begin{array}{r|rrrr} -3/4 & 4 & 3 & 8 & 6 \\ & \downarrow & & & \\ \hline & 4 & 0 & 8 & \boxed{0} \checkmark \end{array}$$

$$4x^2 + 8$$

$$4x^2 + 8 = 0$$

$$4x^2 = -8$$

$$x^2 = -2$$

$$x = \pm i\sqrt{2}$$

Zeros

$$1, -3/4, -i\sqrt{2}, i\sqrt{2}$$

~~$f(x) = (x-1)(4x+3)(x+i\sqrt{2})(x-i\sqrt{2})$~~

$$f(x) = (x-1)(4x+3)(x+i\sqrt{2})(x-i\sqrt{2})$$