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for  $x^2 - 5x - 6 = 0$   
 $(x-6)(x+1) = 0$   
 $x=6, x=-1$

If  $r_1, r_2, \dots$  are zeros of  $f(x)$ , then  $f(x) = (x-r_1)(x-r_2)\dots$

Ex: Write a polynomial function of least degree, with the given zeros:

①  $0, -1, 2/3$

$$f(x) = (x-0)(x+1)(x-2/3)$$

$$= x(x+1)(3x-2)$$

$$= x(3x^2 + x - 2)$$

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

zeros:

②  $-\sqrt{2}, 3i$   
 $(\sqrt{2}, -3i)$  are also zeros

Radical & complex zeros appear in  $\pm$  conjugate pairs

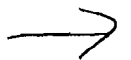
$$f(x) = (x - (-\sqrt{2}))(x - \sqrt{2})(x - 3i)(x - (-3i))$$

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

$$= (x^2 - 2)(x^2 - 9i^2)$$

$$f(x) = (x^2 - 2)(x^2 + 9)$$

$$f(x) = x^4 + 7x^2 - 18$$



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ASSIGNMENT:

$$\textcircled{3} \quad 1, -2, 3-i$$

( $3+i$  is also a zero)

$$\begin{aligned} f(x) &= (x-1)(x+2)(x-(3-i))(x-(3+i)) \\ &= (x^2+x-2)(x^2-(3+i)x-(3-i)x+(9-i^2)) \\ &= (x^2+x-2)(x^2-6x+10) \end{aligned}$$

$$\begin{aligned} &= x^4 - 6x^3 + 10x^2 \\ &\quad + x^3 - 6x^2 + 10x \\ &\quad - 2x^2 + 12x - 20 \end{aligned}$$

$$f(x) = \frac{x^4 - 5x^3 + 2x^2 + 22x - 20}{1}$$