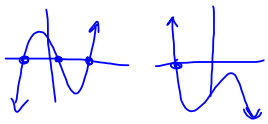
5.6 Zeros - Polynomials

$x^3 + 2x - 7$ Possible: 3 zeros

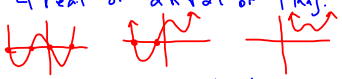
$3 - 2 = 1$ Minimum: 1 zero



Degree 2 2 reals or 2 imags.

3 3 real or 1 real 2 imag.

4 4 real or 2 a+2i or 4 imag.



5 5 real or 3rd2i or 1rd4i

$5 - 2 = 3$ real

$3 - 2 = 1$ real

Imaginary / Complex Zero - Pairs

$-2 - i$	$-2 + i$
$7i$	$-7i$
$7 + 5i$	$7 - 5i$

Zero: $7i$ missing $-7i$

$i^2 = -1$ $(x - 7i)(x + 7i)$

$x^2 + 7ix - 7ix + 49i^2$ $x^2 + 49i^2$

$x^2 + 49 = 0$ $x^2 + 49$

$\sqrt{x^2} = \sqrt{-49}$

$x = \pm 7i$

List of zeros: $-3, 1+i, -3+7i$

Missing Zeros: $1-i, -3-7i$

Degree 4 zeros: $9i, 2, -2$

remaining zeros: $-9i$

T or F

A poly. of degree 4 has

-3, $1+i$, $1-i$, and $-3+7i$ as zeros.

must have conjugate

False

Degree 3 Zeros: $7, 1-i$

Enter remaining zeros: $1+i$

Find the Polynomial: $(x-7)(x-1+i)(x-1-i)$

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

$x^2 - x - x + 1 + i^2$

$x^2 - 2x + 2$

Degree 4 Zeros: 1, mult 2; i; $3i$

Enter remaining zeros: $-3i$

Find the Polynomial: $(x-1)(x-1)(x-3i)(x+3i)$

x^2-2x+1 x^2+9

$(x^2+9)(x^2-2x+1)$

$x^4-2x^3+x^2+9x^2-18x+9$

$x^4-2x^3+10x^2-18x+9$

Find the zeros:

$f(x) = x^3 - 7x^2 + 25x - 39$

$\pm 1, \pm 3, \pm 13, \pm 39$ (1, 3, 13, 39)

$(3)^3 - 7(3)^2 + 25(3) - 39 \stackrel{?}{=} 0$

$x = 3$ (only one)

3 | 1 -7 25 -39

3 -12 39

1 -4 13 0

$x^2 - 4x + 13 = 0$ $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$x = \frac{4 \pm \sqrt{16-4(13)}}{2} = \frac{4 \pm \sqrt{-36}}{2}$

$x = \frac{4 \pm 6i}{2}$

$x = 2 \pm 3i$

Zeros: $3, 2-3i, 2+3i$