Bellwork - Khan Academy

Subject --> SAT --> Practice --> Math -->

Problem Solving and Data Analysis -->

Scatterplots -->

Practice - do 5 questions. Must show me,
this one I can't see from my side of program.

Sec 2.5

Imaginary Roots come in pairs. Why?

$\sqrt{x^2} = \sqrt{9}$ $\qquad$ $\sqrt{x^2} = \sqrt{-4}$

$x = \pm 3$ $\qquad$ $x = \pm 2i$

So if one root is $a+bi$, the conjugate $a - bi$ is the matching root.

Find conjugate of:

$4i$	$-4i$
$-6i$	$6i$
$4 - 6i$	$4 + 6i$
$4 + 6i$	$4 - 6i$
$-4 + 6i$	$-4 - 6i$

ex. Write the polynomial with the following roots: 3, 4, 2*i*, $-2i$

$x = 3 \quad x = 4 \quad x = 2i \quad x = -2i$

$x - 3 = 0 \quad x - 4 = 0 \quad x - 2i = 0 \quad x + 2i = 0$

$$\underbrace{(x-3)(x-4)}\underbrace{(x-2i)(x+2i)} = 0$$

$$(x^2 - 7x + 12)(x^2 + 4) = 0$$

$$x^4 - 7x^3 + \underbrace{12x^2 + 4x^2} - 28x + 48 = 0$$

$$f(x) = x^4 - 7x^3 + 16x^2 - 28x + 48 \cancel{= 0}$$

ex. Find a polynomial from given zeros.

-3, 4, 2 - i , $2+i$

$$\underbrace{(x+3)(x-4)}(x-(2-i))(x-(2+i))$$

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

$$(x^2 - x - 12)(x^2 - 2x \cancel{-ix} - 2x + 4 \cancel{+2i} \cancel{+ix} \cancel{-2i} \overset{+1}{-i^2})$$

$$(x^2 - x - 12)(x^2 - 4x + 5)$$

$$x^4 - 4x^3 + 5x^2 - x^3 + 4x^2 - 5x - 12x^2 + 48x - 60$$

$$x^4 - 5x^3 - 3x^2 + 43x - 60$$

Multiply: $(x - (6 - i))(x - (6 + i))$

$x^2 - 12x + 37$

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

$x^2 - 8x + 17$

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

$x^2 - 6x + 10$

Factoring:

If odd degree, at least 1 real root.

$f(x) = \overset{q}{x^5} - 3x^4 - 5x^3 + 5x^2 - 6x + \overset{p}{8}$ roots

$\frac{p}{q} = \frac{\text{factors of } 8}{\text{factors of } 1}$

$= \frac{\pm 1, 2, 4, 8}{1}$

$= \pm 1, 2, 4, 8$

4	$1x^5$	-3	-5	5	-6	8
		4	4	-4	4	-8
1	$1x^4$	1	-1	1	-2	0
		1	2	1	2	
-2	$1x^3$	2	1	2	0	
		-2	0	-2		
	$1x^2$	0	1	0		

$x^2 + 1 = 0$

$x^2 = -1$

$x = \pm i$

$\boxed{\text{roots: } 4, 1, -2, i, -i}$

Assignment
Mathlab Sec2.5 day2