Name: Key ★100SHUK1!★ Date: 12/6/17

CC ALGEBRA 2 TROICI

LESSON #4: COMPLEX NUMBERS AS SOLUTIONS TO EQUATIONS (DAY 1)

Do Now:

Solve $x^2 + 6x = 0$ for x algebraically and then and sketch it.

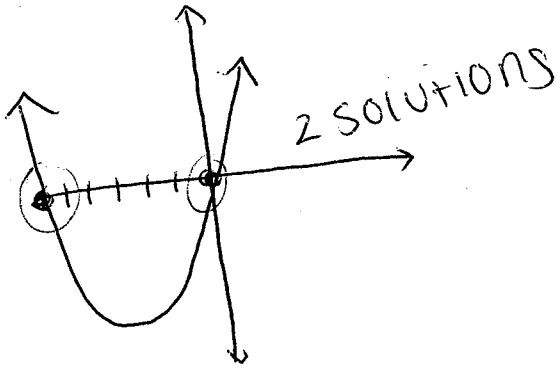
$x(x+6)=0$

$x=0 \mid x=-6$

roots = {0, -6}

y int = 0

EB = UP, UP



1) Find the roots of the following equation by *completing the square*. Leave the roots in simplest $a+bi$ form.

y int = 5

No real roots!

$0 = x^2 + 4x + 5$

$-5 \quad -5$

$x^2 + 4x + \underline{4} = -5 + \underline{4}$

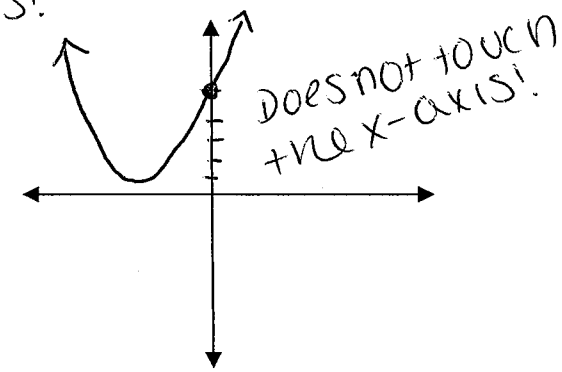
$\left(\frac{4}{2}\right)^2$

$\sqrt{(x+2)^2} = \sqrt{-1}$

$x + 2 = \pm i$

$x = -2 \pm i$

Sketch



2) Solve using the quadratic formula. Leave the roots in simplest $a+bi$ form

Quadratic Formula

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

$\frac{1}{2}x^2 + 1 = x$ set = to zero first!

$\frac{1}{2}x^2 - x + 1 = 0$

$a = .5$

$b = -1$

$c = 1$

$$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(.5)(1)}}{2(.5)}$$

$$x = \frac{1 \pm \sqrt{-1}}{1} = \frac{1 \pm i}{1} = \boxed{1 \pm i}$$

Solve each quadratic equation and express solutions in simplest $a+bi$ form:

Quadratic Formula

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

3) $-4x-x^2=10-6x$

$+4x+x^2 \quad +4x+x^2$

$x^2-2x+10=0$ $\quad a=1,\ b=-2,\ c=10$

$x=\frac{-(-2)\pm\sqrt{(-2)^2-4(1)(10)}}{2(1)}$

$x=\frac{2\pm\sqrt{-36}}{2}$

$x=\frac{2\pm 6i}{2}=1\pm 3i$

4) $4x^2=6x-34+4x+3x^2$

$-10x+34 \quad -10x$

$x^2-10x+34=0$ $\quad a=1,\ b=-10,\ c=34$

$x=\frac{-(-10)\pm\sqrt{(-10)^2-4(1)(34)}}{2(1)}$

$x=\frac{10\pm\sqrt{-36}}{2}$

$x=\frac{10\pm 6i}{2}=5\pm 3i$

5) If $2+i$ and $2-i$ are the roots of the equation $x^2-4x+c=0$, what is the value of c?

plug one in for x

$(2+i)^2-4(2+i)+C=0$

$(2+i)(2+i)-8-4i+C=0$

$4+2i+2i+i^2-8-4i+C=0$

$0 \quad (-1) \quad 0$

$-5+C=0$

$C=5$

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LAB #13

1) Solve using the quadratic formula. Leave the roots in simplest $a+bi$ form

Quadratic Formula

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

$5x^2-2x+2=0$ $a=5$ $b=-2$ $c=2$

$x=\frac{-(-2)\pm\sqrt{(-2)^2-4(2)(5)}}{2(5)}$

$x=\frac{2\pm\sqrt{-36}}{10}$

$x=\frac{2\pm 6i}{10}=\frac{1\pm 3i}{5}$

2) Solve using the quadratic formula. Leave the roots in simplest $a+bi$ form

$7x^2-3x+4=2x^2-4x-1-5x$

$-2x^2+4x+1 \quad -2x^2+4x+1 \quad +5x$

$+5x$

$5x^2+6x+5=0$ $a=5$ $b=6$ $c=5$

$x=\frac{-(6)\pm\sqrt{(6)^2-4(5)(5)}}{2(5)}$

$x=\frac{-6\pm\sqrt{-64}}{10}$

$x=\frac{-6\pm 8i}{10}=\frac{-3\pm 4i}{5}$

3) The expression $x(3i^2)^3 + 2xi^{12}$ is equivalent to:

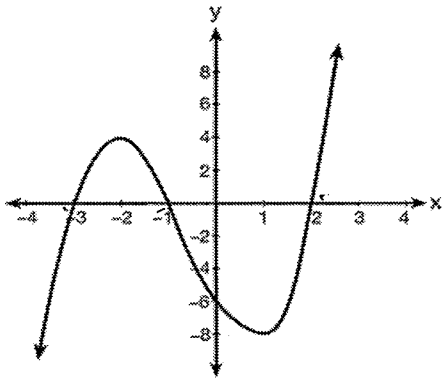
a) 2x + 27xi
b) ~~-7x~~
c) -25x
d) ~~-29x~~

$x(27i^6) + 2xi^{12}$

$x(27(-1)) + 2x(1)$

$-27x + 2x = -25x$

4) Given the graph below:



a) How many roots are there? 3

b) State the roots of the function: -3, -1, 2

c) State the factors of the function: $(x+3)(x+1)(x-2)$