Warm Up

Simplify the following:

a) i^{1028}

$= 1$

b) i^{62}

$= i^{60} \cdot i^{2}$

$= (1)(-1)$

$= -1$

negative exponent means you flip the base

c) i^{-26}

$= \left(\frac{1}{i}\right)^{26}$

$= \left(\frac{1}{i}\right)^{24} \cdot \left(\frac{1}{i}\right)^{2}$

$= \left(\frac{1}{1}\right) \cdot \left(\frac{1}{-1}\right)$

$= (1)(-1)$

$= -1$

Questions From Homework

③ e) $(i^2-1)^2$

$(i^2-1)(i^2-1)$

i^4-2i^2+1

$(1)-2(-1)+1$

$1+2+1$

4

g) $3i(2i^2-5i+2)$

$6i^3-15i^2+6i$

$6(-i)-15(-1)+6i$

$\cancel{-6i}+15\cancel{+6i}$

15

④ c) i^{-13}

$\left(\frac{1}{i}\right)^{13}$

$\left(\frac{1}{i}\right)^{12}\cdot\left(\frac{1}{i}\right)^{1}$

$(1)\cdot\left(\frac{1}{i}\right)$

$\frac{1}{i}\cdot\frac{i}{i}$ realize the denominator

$\frac{i}{i^2}$

$\frac{i}{-1}$

$\boxed{-i}$

Calculate the x-intercepts (roots) of the following functions. (Let $y=0$)

$y = x^2 - 2x + 5$

Factor?

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

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

$a = 1$

$b = -2$

$c = 5$

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

$$x = \frac{2 \pm \sqrt{4 - 20}}{2}$$

$$x = \frac{2 \pm \boxed{\sqrt{-16}}}{2}$$

$\sqrt{-16}$

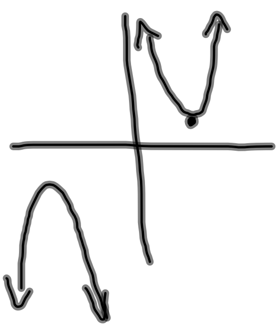
$\sqrt{16} \cdot \sqrt{-1}$

$4i$

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

$$\boxed{x = 1 \pm 2i}$$

Two imaginary roots!



Solve for x

Multiply each term by the LCD.

LCD = $(x+3)(x+2)$

$$\frac{3\,\cancel{(x+3)}(x+2)}{\cancel{x+3}} - \frac{2(x+3)\cancel{(x+2)}}{\cancel{x+2}} = \frac{1}{1}(x+3)(x+2)$$

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

$$3x+6-2x-6 = x^2+5x+6$$

$$x = x^2+5x+6$$

$$0 = x^2+4x+6$$

$a=1$

$b=4$

$c=6$

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

$$x = \frac{-4 \pm \sqrt{(4)^2-4(1)(6)}}{2(1)}$$

$$x = \frac{-4 \pm \sqrt{16-24}}{2}$$

$$x = \frac{-4 \pm \boxed{\sqrt{-8}}}{2}$$

$$x = \frac{-4 \pm \boxed{2i\sqrt{2}}}{2}$$

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

$$\frac{3}{x+3}-\frac{2}{x+2}=1$$

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

$$\frac{3(x+2)-2(x+3)}{(x+3)(x+2)}=1$$

$$\frac{3x+6-2x-6}{x^2+5x+6}=1$$

$$\frac{x}{x^2+5x+6}=\frac{1}{1}$$

$$x=x^2+5x+6$$

$$0=x^2+4x+6$$

The Argand Plane

Complex numbers can be represented geometrically in the complex plane, often called the Argand plane after Jean R. Aragand who gave the representation in 1806.

The complex number 3 + 2i is represented by the directed line segment, or vector, from the origin to the point (3, 2). The horizontal axis is the ***real axis,*** and the vertical axis is the ***imaginary axis.*** Real numbers, such as 5 are written in the form 5 + 0i and are represented by points on the real axis. Pure imaginary numbers such as 3i, are written 0 + 3i and are represented by points on the imaginary axis