Do Now: ① $2x^4 = 24$

Solve: ② $x^2 + 4 = 0$

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

No real ans.

$x = \pm\sqrt{4}\cdot\sqrt{-1}$

$x = \pm 2i$

Imaginary unit: $i = \sqrt{-1}$

$\therefore\ i^2 = (\sqrt{-1})^2 = -1$

$i^3 = i \cdot i^2 = i \cdot -1 = -i$

$i^4 = i^3 \cdot i = -i \cdot i = -i^2 = 1 \ldots$

ex: ① $\sqrt{-25} = \sqrt{25}\sqrt{-1} = 5i$

② $\sqrt{-72} = \sqrt{36}\sqrt{2}\sqrt{-1} = 6i\sqrt{2}$ } pure imaginary

③ $-5\sqrt{-9} = -5 \cdot 3i = -15i$

Complex #: $a + bi$ form

a: real, b: imaginary

Operations w/ complex #s:

CALC.

① a) $(8-i)+(5+4i) = 13+3i$

b) $(7-6i)-(3-6i) = 4$

c) $13-(2+7i)+5i = 13-2-7i+5i = 11-2i$

d) $4i(-6+i) = -24i+4i^2 \xrightarrow{(-1)} -24i-4 \to -4-24i$

e) $(9-2i)(-4+7i)$ FOIL $= -36+63i+8i-14i^2 \xrightarrow{(-1)}$

$= -36+71i+14 = \boxed{-22+71i}$

Find $x+y$: if $x-7i=10+yi$

real: $x=10$ ✓ $x=5$

imag.: $-7i=yi$ ✓ $y=-7$

Do Now

Solve: ① $2x^2-11=-47$

$+11 \quad +11$

$\frac{2x^2}{2}=\frac{-36}{2}$

$\sqrt{x^2}=\sqrt{-18}$

$x=\pm 3i\sqrt{2}$

② $4x^2+20=0$

$\frac{4x^2}{4}=\frac{-20}{4}$

$\sqrt{x^2}=\sqrt{-5}$

$x=\pm i\sqrt{5}$

③ Find zeros of $f(x)=9x^2+1$

$9x^2+1=0$

$-1 \quad -1$

$\frac{9x^2}{9}=\frac{-1}{9}$

$\sqrt{x^2}=\sqrt{\frac{-1}{9}}$

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

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