## 4-4 Imaginary & Complex Numbers

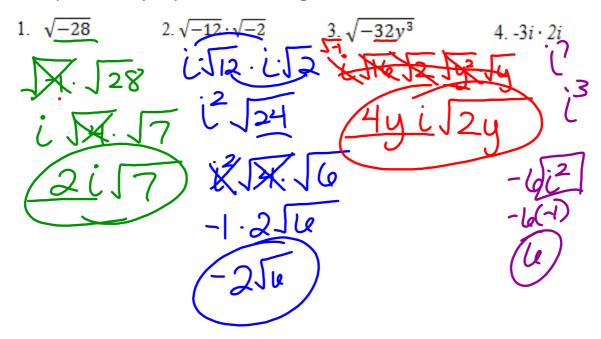
- simplify imaginary & complex numbers solve for an unknown using imaginary & complex numbers

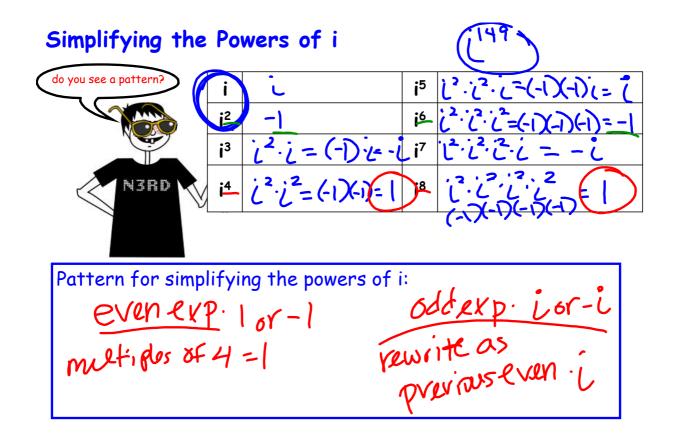
imaginary unit = i L i<sup>2</sup> = ~1 X

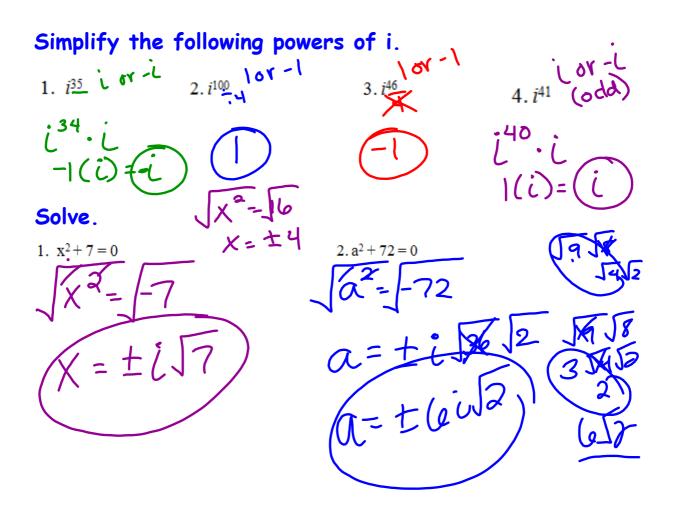
definition of a pure imaginary number: for any positive number b,

$$\sqrt{-b^2} = \sqrt{4} \cdot \sqrt{b^2}$$
  
ib  
bi

## Examples: Simplify the following.





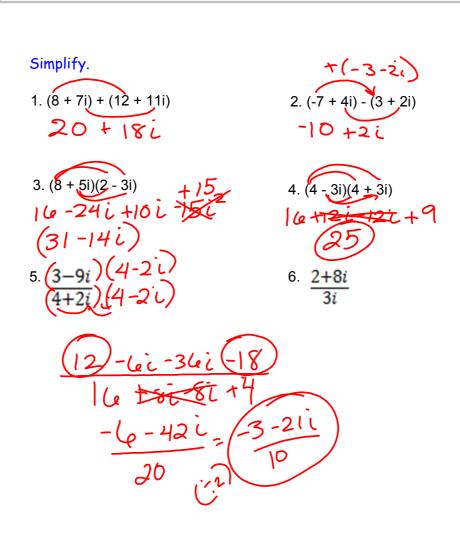


**Definition of a complex number:** a number that can be written in the form (a + bi) where a and b are real numbers and i is the imaginary unit.

- a is called the real part.
- b is called the imaginary part.
- two complex numbers are equal IFF the real parts are equal and the imaginary parts are equal.

## To Simplify Imaginary & Complex Numbers

- NO imaginary roots in the radicand. \_-3
- NO imaginary/complex numbers in the denominator.
- Powers of i MUST be simplified.  $i^{40} = 1$
- Combine like terms and multiply i like all other variables.



Solve for x and y.

7. 5x - 3yi = 2 + 9i

8. 4x + 9i = 12 + y

