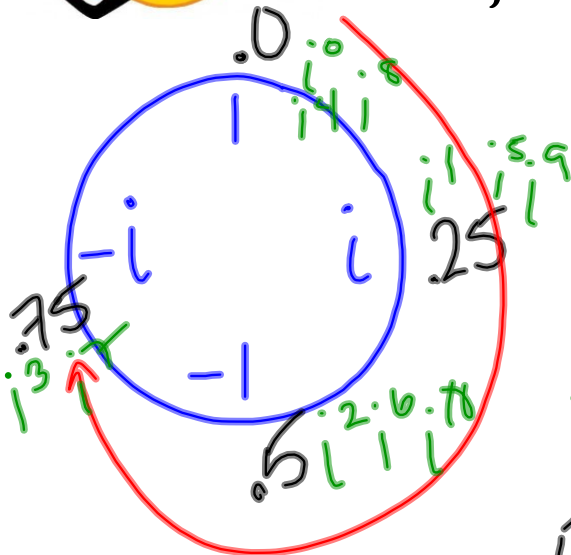




Warm Up:

Simplify  $i^8 \cdot i^9 \cdot i^{10}$  completely.



Method 1:  $\cdot 8 + 9 + 10$

$27 \div 4 = 6.75$

$i^{27} = (-i)$

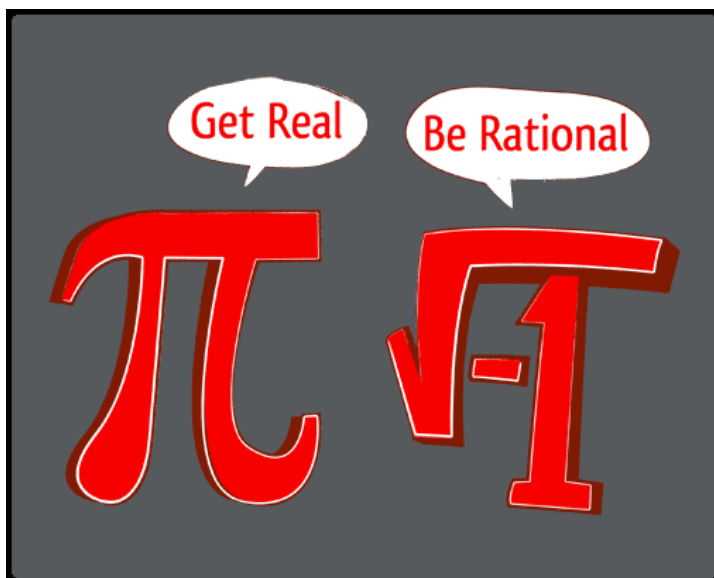
Method 2:  $(i)(-1) = (-i)$

Method 3:

$(1)(i)(-1) = (-i)$

$8 \div 4 = 2$   
 $9 \div 4 = 2.25$   
 $10 \div 4 = 2.5$

Explain the math humor in  
this cartoon:



## Operations with Radicals & Complex Numbers

★ In order to add or subtract radicals, we need to have like radicals

like-radicals- Like-terms w/ same Radicand +  
index

complex number- # in form  $(a+bi)$   
where  $a$  is Real and  $bi$  is  
imaginary



### Addition Examples

Find the sum of  $\sqrt[3]{6a^4b^2}$  and  $\sqrt[3]{162a^4b^2}$ ,  
expressed in simplest radical form

$$\begin{aligned} & \sqrt[3]{6a^4b^2} + \sqrt[3]{162a^4b^2} \\ & \sqrt[3]{6} \sqrt[3]{a^3} \sqrt[3]{a} \sqrt[3]{b^2} + \sqrt[3]{27 \cdot 6} \sqrt[3]{a^3} \sqrt[3]{a} \sqrt[3]{b^2} \\ & \underline{1a\sqrt[3]{6ab^2}} + \underline{3a\sqrt[3]{6ab^2}} = \boxed{4a\sqrt[3]{6ab^2}} \end{aligned}$$

$$\begin{aligned} & 3\sqrt{-18} + 5\sqrt{-12} \\ & 3i\sqrt{18} + 5i\sqrt{12} \\ & 3i\sqrt{9 \cdot 2} + 5i\sqrt{4 \cdot 3} \\ & 3i \cdot 3\sqrt{2} + 5i \cdot 2\sqrt{3} \\ & \boxed{9i\sqrt{2} + 10i\sqrt{3}} \end{aligned}$$

Multiplication Examples

Step 1: Multiply or Divide

Step 2: Simplify

conjugate pairs

Find the product of  $(3 + \sqrt{5})$  and  $(3 - \sqrt{5})$ .

$$(3 + \sqrt{5})(3 - \sqrt{5})$$

$$9 - 3\sqrt{5} + 3\sqrt{5} - \sqrt{25}$$

$$9 - 5$$

$$4$$

If  $x = 3i$ ,  $y = 2i$ , and  $z = (m + i)$ , then what does the expression  $xy^2z$  equal?

Express in simplest radical form:

~~$\frac{\sqrt{108x^5y^8}}{\sqrt{6xy^5}}$~~

$$\sqrt{\frac{108x^5y^8}{6xy^5}}$$

$$\sqrt{18x^4y^3}$$

$$\sqrt{9} \sqrt{x^4} \sqrt{y^3}$$

$$3x^2y\sqrt{2y}$$

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

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

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

$$-6i + 15$$

$$15 - 6i$$

$$(-2 + 6i)(3 + 4i)$$

$$-6 + 10i + 24(-1)$$

$$-6 + 10i - 24$$

$$-30 + 10i$$

	-2	+6i
3	-6	+18i
+4i	-8i	+24i <sup>2</sup>

Homework: p. 97 #24; p. 101 #29;  
p. 215-216 #8, 9, 30, 32

### Developing Skills

In 3–38 write each expression in simplest form. Variables in the radicand with an even index are non-negative. Variables occurring in the denominator of a fraction are non-zero.

$$24. \sqrt{162a^4b^3} + 3 - ab\sqrt{18a^2b} - 1$$

### Developing Skills

In 3–41, express each product in simplest form. Variables in the radicand with an even index are non-negative.

$$29. \sqrt{12xy^3}(\sqrt{3xy} + 3)$$

### Developing Skills

In 3–17, find each sum or difference of the complex numbers in  $a + bi$  form.

$$8. (4 + 12i) + (-4 - 2i)$$

$$9. (1 + 9i) - (1 + 2i)$$

In 26–37, find each product.

$$30. (7 + i)(2 + 3i)$$

$$32. (-4 - i)(-4 + i)$$