Lesson 29- Objective: SWBAT determine powers of i to evaluate an expression.

Kickoff- Rationalize the denominator for each of the following:

1) $\frac{\sqrt{5}}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{\sqrt{30}}{6}$

2) $\frac{3-\sqrt{8}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$\frac{3\sqrt{2}-\sqrt{16}}{2}$

$\frac{3\sqrt{2}-4}{2}$

$\frac{3\sqrt{2}}{2} - 2$

Complex Numbers- Powers of i

Try This: Evaluate Rational Answers

1) $\sqrt{4}$ 2

2) $\sqrt{25}$ 5

3) $\sqrt{-4}$ Not Rational $2i$

4) $\sqrt{-25}$ $5i$

Imaginary Numbers-

$\sqrt{-1} = i$

Ex1. $-\sqrt{-1}$ $-i$

Ex2. $\sqrt{-7}$ $i\sqrt{7}$

Ex3. $\sqrt{-36}$ $6i$

Ex4. $-2\sqrt{-9}$ $-6i$

Simplifying:

1) $\sqrt{-20}$

$i\sqrt{20}$

$i\sqrt{4}\sqrt{5}$

$2i\sqrt{5}$

2) $5\sqrt{-72}$

$5 \cdot i\sqrt{72}$

$5 \cdot i\sqrt{36}\sqrt{2}$

$5 \cdot 6i\sqrt{2}$

$30i\sqrt{2}$

Powers of *i*

$i^0 = 1$

$i^1 = i$

$i^2 = \sqrt{-1} \cdot \sqrt{-1} = -1$

$i^3 = -1(i) = -i$

$i^4 = 1$

$i^5 = i$

$i^6 = -1$

$i^7 = -i$

$i^8 = 1$

$i^9 = i$

$i^{10} = -1$

$i^{11} = -i$

Powers of *i* on the Calculator

math

Num

(3) i-part

Examples:

1) i^{82} -1

2) i^{99} $-i$

3) i^{300} 1

4) i^{2001} i

5) $2i^2 \cdot 3i^3$

$2(-1) \cdot 3(-i)$

$6i$

6) $(3i^3)^2$

$3^2 i^6$

$9(-1)$

-9