June 23, 2015

8.5 #3) $\sqrt[3]{\frac{27}{64}} = \frac{\sqrt[3]{27}}{\sqrt[3]{64}} = \frac{3}{4}$ (quotient rule)

Both are Perfect Cube Roots

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8.5 #61) $\frac{7}{(\sqrt{2}-3)} \cdot \frac{(\sqrt{2}+3)}{(\sqrt{2}+3)}$ Conjugate pair

$\frac{7\sqrt{2}+21}{2-9}$ (F, L)

$\frac{7(\sqrt{2}+3)}{-7} = -(\sqrt{2}+3)$ or $= -\sqrt{2}-3$

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$\frac{7(\sqrt{2}+3)}{-7} = -\frac{7(\sqrt{2}+3)}{7}$

$= \frac{-7(\sqrt{2}+3)}{7}$

$= \frac{(-1)\cancel{7}(\sqrt{2}+3)}{\cancel{7}}$

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

$= -\sqrt{2}-3$

Fact

$-\frac{a}{b} = \frac{a}{-b} = \frac{-a}{b}$

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8.5 #16) $\sqrt{\frac{5c^3}{36a^8b^{12}}} = \frac{\sqrt{5c^3}}{\sqrt{36a^8b^{12}}}$ ← Perfect Square Root

$= \frac{\sqrt{5(c^1)^2 c}}{6a^4b^6}$

$= \frac{c\sqrt{5c}}{6a^4b^6}$

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8.5 #25) $\sqrt[3]{\frac{20x^2}{9y^2}} = \frac{\sqrt[3]{20x^2}}{\sqrt[3]{9y^2}}$

$\frac{\sqrt[3]{20x^2}}{\sqrt[3]{9y^2}} \cdot \frac{\sqrt[3]{3y^1}}{\sqrt[3]{3y^1}} = \frac{\sqrt[3]{60x^2y}}{\sqrt[3]{27y^3}} = \frac{\sqrt[3]{60x^2y}}{3y}$

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① $\sqrt{-1} = i$

② $i^2 = -1$

$i^3 - i^4$

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

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

$-i - 1 = -i + (-1)$ not in $a+bi$ form

$-1 - i$

$a = -1$, $b = -1$

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

$8 - 5 = 8 + (-5)$

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Write result in a + bi form

$i^6 + i^8$

$(i^2)^3 \cdot i^2 + (i^2)^4$

$(-1)^3 \cdot (-1) \quad (1)^4$

$-1 + 1$

0

$0 + 0i$

i^6

$i^3 \cdot i^3 + 1$

$(-i)(-i)$

i^2

$(-1) + 1 = 0 \rightarrow 0 + 0i$

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Complex Number Operations

Addition

$(3x + 2) + (5x + 7)$

$(3x + 5x) + (2 + 7)$

$8x + 9$

Collect Like Terms

$(3 + 2i) + (5 + 7i)$

$(3 + 5) + (2i + 7i)$

$8 + (2 + 7)i$

$8 + 9i$

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$(-1 - 2i) + (6 + 9i)$

$(-1 + 6) + (-2 + 9)i$

$5 + 7i$

$(11 + 1i) - (2 + 3i)$

$(11 + (-2)) + (1 + (-3))i$

$9 + (-2)i$

$9 - 2i$

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Multiplication

$2i(6i) = 2 \cdot i \cdot 6 \cdot i$

$= 2 \cdot 6 \cdot i \cdot i$

$= 12i^2 \quad i^2 = -1$

$= -12$

$= -12 + 0i$

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$-i(4 + 8i)$

$-4i - 8i^2$

$-4i - 8(-1)$

$-4i + 8$

$8 - 4i$

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FOIL

$(5 - 2i)(3 + 7i)$

F: $5(3) = 15$

O: $5(7i) = 35i$

I: $-2i(3) = -6i$

L: $-2i(7i) = -14i^2 = 14$

$29 + 29i$

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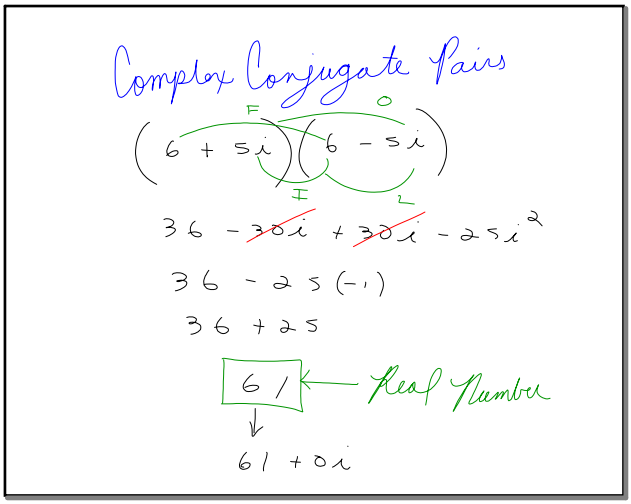
Complex Conjugate Pairs
F
O
I
L
$(6+5i)(6-5i)$
$36-30i+30i-25i^2$
$36-25(-1)$
$36+25$
61
Real Number
$61+0i$

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