

Name Schlansky
Mr. Schlansky

Date _____
Algebra II

Sum and Difference of Two Cubes

Factor the following polynomials

SOAP

1. $\sqrt[3]{x^3 - 8}$

$a = x$
 $b = 2$ $\sqrt[3]{x^3 - 8}$

$a = x$
 $b = 2$
 $(a^3 - b^3) = (a - b)(a^2 + ab + b^2)$
 $x^3 - 2^3 = (x - 2)(x^2 + 2x + 4)$

$(a^3 + b^3) = (a + b)(a^2 - ab + b^2)$
 $(a^3 - b^3) = (a - b)(a^2 + ab + b^2)$
 $(x^3 - 8) = (x - 2)(x^2 + 2x + 4)$

$\sqrt[3]{y^3 - 125}$ $a = y$
 $b = 5$

$(a^3 - b^3) = (a - b)(a^2 + ab + b^2)$
 $(y^3 - 5^3) = (y - 5)(y^2 + 5y + 25)$

$\sqrt[3]{z^3 + 64}$ $a = z$
 $b = 4$

$(a^3 + b^3) = (a + b)(a^2 - ab + b^2)$
 $z^3 + 4^3 = (z + 4)(z^2 - 4z + 16)$

$\sqrt[3]{8x^3 + y^6}$ $a = 2x$
 $b = y^2$

$(a^3 + b^3) = (a + b)(a^2 - ab + b^2)$
 $(2x)^3 + (y^2)^3 = (2x + y^2)(4x^2 - 2xy^2 + y^4)$

$\sqrt[3]{y^9 - 216x^3}$ $a = y^3$
 $b = 6x$

$(a^3 - b^3) = (a - b)(a^2 + ab + b^2)$
 $(y^3)^3 - (6x)^3 = (y^3 - 6x)(y^6 + 6xy^3 + 36x^2)$

$$\sqrt[7]{1000x^{12}} - \sqrt[3]{27y^3} \quad a=10x^4 \\ b=3y$$

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

$$(10x^4)^3 - (3y)^3 = (10x^4 - 3y)(100x^{12} + 30x^4y + 9y^3)$$

$$\sqrt[8]{343x^{15}} + \sqrt[3]{1} \quad a=7x^5 \\ b=1$$

$$(a^3 + b^3) = (a+b)(a^2 - ab + b^2)$$

$$(7x^5)^3 + (1)^3 = (7x^5 + 1)(49x^{10} - 7x^5 + 1)$$

$$\sqrt[9]{8} - \sqrt[4]{331x^{24}} \quad a=2 \\ b=11x^8$$

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

$$2^3 - (11x^8)^3 = (2 - 11x^8)(4 + 22x^8 + 121x^{16})$$

$$\sqrt[10]{729x^3} + \sqrt[3]{y^6} \quad a=9x \\ b=y^2$$

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

$$(9x)^3 + (y^2)^3 = (9x + y^2)(81x^2 - 9xy^2 + y^4)$$

$$\sqrt[11]{64x^{18}} - \sqrt[3]{125y^9} \quad a=4x^6 \\ b=5y^3$$

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

$$(4x^6)^3 - (5y^3)^3 = (4x^6 - 5y^3)(16x^{12} + 20x^6y^3 + 25y^6)$$

$$\sqrt[12]{27y^9} + \sqrt[3]{8x^{12}} \quad a=3y^3 \\ b=2x^4$$

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

$$(3y^3)^3 + (2x^4)^3 = (3y^3 + 2x^4)(9y^6 - 6x^4y^3 + 4x^8)$$