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

Factoring Polynomials

Emphasis on Factoring Sum of Cubes

Completely factor each of the following using SOAP:

1. $x^3 + 8$ $(x+2)(x^2 - 2x + 4)$ $\sqrt[3]{x^3} = x$ = a term $\sqrt[3]{8} = 2$ = b term	2. $x^3 + 64$ $(x+4)(x^2 - 4x + 16)$ $\sqrt[3]{x^3} = x$ = a term $\sqrt[3]{64} = 4$ = b term
3. $x^3 + 216$ $(x+6)(x^2 - 6x + 36)$ $\sqrt[3]{x^3} = x$ = a term $\sqrt[3]{216} = 6$ = b term	4. $x^3 + 512$ $(x+8)(x^2 - 8x + 64)$ $\sqrt[3]{x^3} = x$ = a term $\sqrt[3]{512} = 8$ = b term
5. $x^3 + 1000$ $(x+10)(x^2 - 10x + 100)$ $\sqrt[3]{x^3} = x$ = a term $\sqrt[3]{1000} = 10$ = b term	6. $x^3 + 3375$ $(x+15)(x^2 - 15x + 225)$ $\sqrt[3]{x^3} = x$ = a term $\sqrt[3]{3375} = 15$ = b term
7. $x^3 + 2197$ $(x+13)(x^2 - 13x + 169)$ $\sqrt[3]{x^3} = x$ = a term $\sqrt[3]{2197} = 13$ = b term	8. $x^3 + 1331$ $(x+11)(x^2 - 11x + 121)$ $\sqrt[3]{x^3} = x$ = a term $\sqrt[3]{1331} = 11$ = b term
9. $x^3 + 729$ $(x+9)(x^2 - 9x + 81)$ $\sqrt[3]{x^3} = x$ = a term $\sqrt[3]{729} = 9$ = b term	10. $x^3 + 343$ $(x+7)(x^2 - 7x + 49)$ $\sqrt[3]{x^3} = x$ = a term $\sqrt[3]{343} = 7$ = b term

11. $8x^3 + 216$

$\frac{8}{8}$ $\frac{216}{8}$

$\sqrt[3]{x^3} = x$ = a term

$\sqrt[3]{27} = 3$ = b term

$x^3 + 27$

$8(x+3)(x^2 - 3x + 9)$

12. $125x^3 + 8$

$(5x+2)(25x^2 - 10x + 4)$

$\sqrt[3]{125x^3} = 5x$ = a term

$\sqrt[3]{8} = 2$ = b term

13. $2744x^3 + 27$

$(14x+3)(196x^2 - 42x + 9)$

$\sqrt[3]{2744x^3} = 14x$ = a term

$\sqrt[3]{27} = 3$ = b term

14. $1728x^3 + 216$

$\frac{1728}{216}$ $\frac{216}{216}$

$8x^3 + 1$

$216(2x+1)(4x^2 - 2x + 1)$

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

$\sqrt[3]{1} = 1$ = b term

15. $2197x^3 + 512$

$(13x+8)(169x^2 - 104x + 64)$

$\sqrt[3]{2197x^3} = 13x$ = a term

$\sqrt[3]{512} = 8$ = b term

16. $3375x^3 + 1$

$(15x+1)(225x^2 - 15x + 1)$

$\sqrt[3]{3375x^3} = 15x$ = a term

$\sqrt[3]{1} = 1$ = b term

17. $64x^3 + 343$

$(4x+7)(16x^2 - 28x + 49)$

$\sqrt[3]{64x^3} = 4x$ = a term

$\sqrt[3]{343} = 7$ = b term

18. $1331x^3 + 729$

$(11x+9)(121x^2 - 99x + 81)$

$\sqrt[3]{1331x^3} = 11x$ = a term

$\sqrt[3]{729} = 9$ = b term

19. $1000x^3 + 1$

$(10x+1)(100x^2 - 10x + 1)$

$\sqrt[3]{1000x^3} = 10x$ = a term

$\sqrt[3]{1} = 1$ = b term

20. $27x^3 + 729$

$\frac{27}{27}$ $\frac{729}{27}$

$x^3 + 27$

$27(x+3)(x^2 - 3x + 9)$

$\sqrt[3]{x^3} = x$ = a term

$\sqrt[3]{27} = 3$ = b term