Name ______________________________ Period_________ Date________________

Cube Roots (page 1)

A **cube root** of a number is a number that, when multiplied by itself, and the multiplied by itself again, equals the given number. A **perfect cube** is a number with an integer as its cube root. The symbol used for a cube root: $\sqrt[3]{}$.

Examples: *Find the cube roots*:

a) $\sqrt[3]{8} = 2$ because $2\cdot 2\cdot 2 = 2^3,\ 2^3 = 8,\ so\ \sqrt[3]{8} = \sqrt[3]{2^3} = 2$

b) $\sqrt[3]{-27} = -3$ because $-3(-3)(-3) = (-3)^3,\ (-3)^3 = -27,\ so\ \sqrt[3]{-27} = \sqrt[3]{(-3)^3} = -3$

c) $\sqrt[3]{\frac{8}{27}} = \frac{2}{3}$

Evaluate the expressions:

a) $4\sqrt[3]{27} = 4(3)$
$= 12$

b) $\left(\sqrt[3]{64}\right)^3 + 8 = 64 + 8$
$= 72$

c) $\sqrt[3]{-\frac{27}{64}} = -\frac{3}{4}$

d) $\sqrt[3]{1} = 1$

e) $\sqrt[3]{-216} = -6$

f) $17 - 2\sqrt[3]{8} = 17 - 2(2)$
$= 13$

Solve for x.

a) $x^3 = 125$

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

b) $x^3 = -64$

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

c) Using the formula for volume of a cube, $V = s^3$, find the edge length for a cube with a volume of 27 in^3.

$V = s^3$
$27 = s^3$
$\sqrt[3]{27} = \sqrt[3]{s^3}$
$3 = s$

The edge length is 3 inches.

Cube Roots (page 2)

Find the value of each perfect cube:

1. 3^3 **2.** 5^3 **3.** 10^3 **4.** 1^3 **5.** 7^3 **6.** 20^3

***Find the cube root of the number*:**

7. 27 **8.** 64 **9.** 1000 **10.** 729

Simplify the expressions:

11. $3\sqrt[3]{8}$

12. $\left(\sqrt[3]{64}\right)^3 + 27$

13. $\sqrt[3]{-\frac{64}{125}}$

14. $\sqrt[3]{-1}$

15. $\sqrt[3]{343}$

16. $20 - 4\sqrt[3]{8}$

Solve:

17. $x^3 = 8$

18. $x^3 = 216$

19. $x^3 = -27$

20. $x^3 = 343$

21. $x^3 = -729$

22. $x^3 = 1$

23. The volume of a Rubik's cube is 216 cm^3, what is the length of one of its sides?