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?