7.2 Cube Roots p.296

A cube root of a number is a number that, when multiplied by itself, and then multiplied by itself again, equals the given number.

A perfect cube is a number that can be written as the cube of an integer.

The symbol $\sqrt[3]{}$ is used to represent a cube root.

① Find each cube root

a) $\sqrt[3]{8} = 2$

b) $\sqrt[3]{-27} = -3$

c) $\sqrt[3]{\frac{1}{64}} = \frac{1}{4}$

d) $\left(\sqrt[3]{5}\right)^3 = 5$

* Cube root and cubing a number are inverse operations i.e. they undo each other

② Evaluate:

a) $2\sqrt[3]{-216} - 3$
$2(-6) - 3$
$-12 - 3$
$\boxed{-15}$

b) $\left(\sqrt[3]{125}\right)^3 + 21$
$125 + 21$
$\boxed{146}$

c) $5\sqrt[3]{512} - 19$
$5(8) - 19$
$40 - 19$
$\boxed{21}$

d) $18 - 4\sqrt[3]{8}$
$18 - 4(2)$
$18 - 8$
$\boxed{10}$

e) $\left(\sqrt[3]{-64}\right)^3 + 43$
$-64 + 43$
$\boxed{-21}$

③ Evaluate an Algebraic Expression

a) $\frac{x}{4} + \sqrt[3]{\frac{x}{3}}$ when $x = 192$

$\frac{192}{4} + \sqrt[3]{\frac{192}{3}} = 48 + \sqrt[3]{64} = 48 + 4 = \boxed{52}$

b) $\sqrt[3]{8y} + y$ when $y = 64$

$\sqrt[3]{8(64)} + 64 = \sqrt[3]{512} + 64 = 8 + 64 = \boxed{72}$

c) $2b - \sqrt[3]{9b}$ when $b = -3$

$2(-3) - \sqrt[3]{9(-3)} = -6 - \sqrt[3]{-27}$

$-6 - (-3)$

$-6 + 3$

$\boxed{-3}$

d) $\frac{w}{30} - \sqrt[3]{\frac{w}{5}}$ when $w = 1080$

$\frac{1080}{30} - \sqrt[3]{\frac{1080}{5}}$

$36 - \sqrt[3]{216} = 36 - 6 = \boxed{30}$