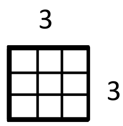
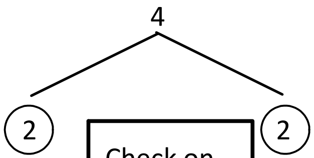
M8 - 3.2 - Solving Square Roots Prime Factorization Notes

Perfect Square: A number that is the product of the same two factors. $9 = 3 \times 3 = 3^2$



$\sqrt{9} = 3$ $3^2 = 3 \times 3 = 9$

$\sqrt{4} = ?$



Check on Calculator!

$\sqrt{4} = 2$

4 is a perfect square because it is a product of the same two factors: 2 and 2.

$\sqrt{4} = \sqrt{2 \times 2}$

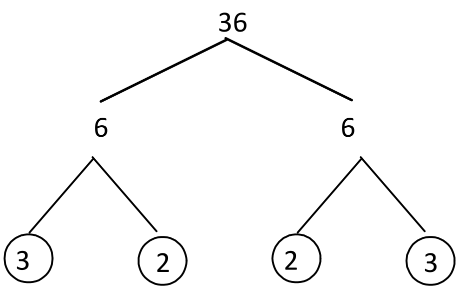
$\sqrt{4} = \sqrt{2 \times 2}$

$= 2$

Two identical numbers under a square root: one comes out. Nothing is left.

OR Think about two identical numbers that multiply together to make that number

$\sqrt{36} = ?$



36 is a perfect square because it is a product of even pairs of numbers: 3 and 2, and 3 and 2.

$\sqrt{36} = \sqrt{2 \times 2 \times 3 \times 3}$

$\sqrt{36} = \sqrt{(2 \times 2) \times (3 \times 3)}$

$\sqrt{36} = 2 \times 3$

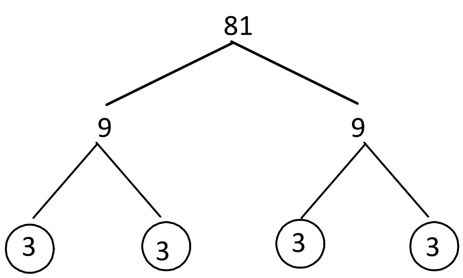
$\sqrt{36} = 6$

Two identical pairs of numbers under a square root: one of each comes out. Nothing is left.

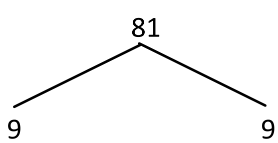
Check on Calculator!

$\sqrt{36} = 6$

$\sqrt{81} = ?$



OR



81 is a perfect square because it is a product of even pairs of numbers: 3 and 3, and 3 and 3.

$\sqrt{81} = \sqrt{3 \times 3 \times 3 \times 3}$

$\sqrt{81} = \sqrt{(3 \times 3) \times (3 \times 3)}$

$\sqrt{81} = 3 \times 3$

$\sqrt{81} = 9$

Two identical pairs of numbers under a square root: one of each comes out. Nothing is left.

$\sqrt{81} = \sqrt{9 \times 9}$

$= 9$

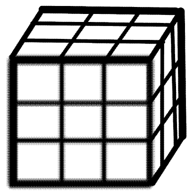
Check on Calculator!

$\sqrt{81} = 9$

Notice: when solving square roots using prime factorization either circle a pair of two identical numbers or multiple pairs of identical numbers.

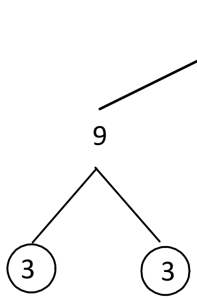
M8 - 3.2 - Solving Cube Roots Prime Factorization Notes

Perfect Cube: a number that is a product of the same three factors. $8 = 2 \times 2 \times 2 = 2^3$



$\sqrt[3]{27} = 3$ $\quad 3 \times 3 \times 3 = 3^3 = 27$

$\sqrt[3]{27} = ?$



27 is a perfect cube because it is the product of three identical factors:

$\sqrt[3]{27} = \sqrt[3]{3 \times 3 \times 3}$

$\sqrt[3]{27} = \sqrt[3]{3 \times 3 \times 3}$

$= 3$

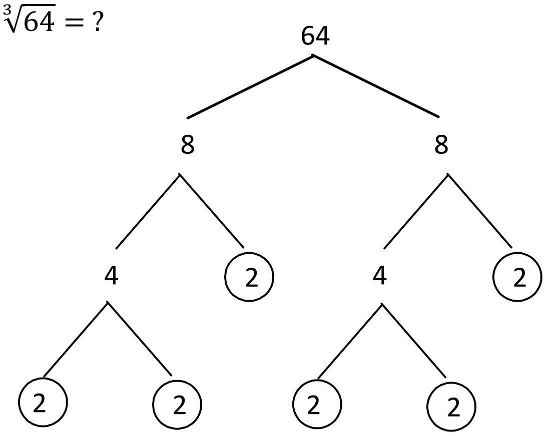
Three identical numbers under a cube root: one comes out. Nothing is left.

Check on Calculator!

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

OR Think about three identical numbers that multiply together to make that number

$\sqrt[3]{64} = ?$



$\sqrt[3]{64} = \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2}$

$\sqrt[3]{64} = \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2}$

$= 2 \times 2$

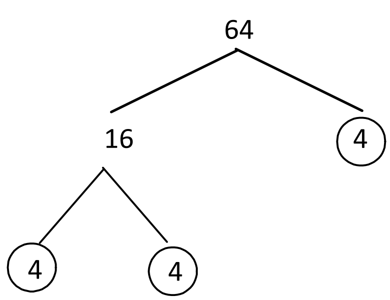
$= 4$

Three identical numbers under a square root: one of each comes out. Nothing is left.

Check on Calculator!

$\sqrt[3]{64} = 4$

OR



$\sqrt[3]{64} = \sqrt[3]{4 \times 4 \times 4}$

$= 4$

Notice: when solving cube roots using prime factorization either circle a triplet of three identical numbers or multiple triplets of identical numbers.