

$256 \times 256 = 65536$; and $75 \times 75 = 5625$: Then $65536 - 5625 = 59911$, and $\sqrt{59911} = 244.76+$ and $244.76 - \frac{4}{8} = 222.76$ feet, Answer.

PROB. XIV. Suppose a ladder 60 feet long be so planted as to reach a window 37 feet from the ground, on one side of the street, and without moving it at the foot will reach a window 23 feet high on the other side; I demand the breadth of the street.

$60 \times 60 = 3600$. $37 \times 37 = 1369$. $23 \times 23 = 529$. Then, $3600 - 1369 = 2231$, and $\sqrt{2231} = 47.23+$, and $3600 - 529 = 3071$, and $\sqrt{3071} = 55.41+$, then $47.23 + 55.41 = 102.64$ feet, Ans.

PROB. XV. Two ships sail from the same port; one goes due north 45 leagues, and the other due west 76 leagues: How far are they asunder?

$45 \times 45 = 2025$. $76 \times 76 = 5776$. Then, $5776 + 2025 = 7801$ and $\sqrt{7801} = 88.32$ leagues, the Answer.

EXTRACTION OF THE CUBE ROOT.

A Cube is any number multiplied by its square. To extract the cube root, is to find a number which being multiplied into its square, shall produce the given number

RULE.

1. Separate the given number into periods of three figures each, by putting a point over the unit figure and every third figure beyond the place of units.
2. Find the greatest cube in the left hand period, and put its root in the quotient.
3. Subtract the cube thus found, from the said period, and to the remainder bring down the next period, and call this the dividend.
4. Multiply the square of the quotient by 300, calling it the triple square, and the quotient by 30 calling it the triple quotient, and the sum of these call the divisor.
5. Seek how often the divisor may be had in the dividend, and place the result in the quotient.
6. Multiply the triple square by the last quotient figure, and write the product under the dividend; multiply the square of the last quotient figure by the triple quotient,

The Method of Operation.

$$7 \times 7 \times 300 = 14700 = 1^{\text{st}} \text{ Triple square.}$$

$$7 \times 30 = 210 = 1^{\text{st}} \text{ Triple quotient.}$$

$$14910 = 1^{\text{st}} \text{ Divisor.}$$

$$14700 \times 5 = 73500.$$

$$5 \times 5 \times 210 = 5250$$

$$5 \times 5 \times 5 = 125$$

$$78875 = 1^{\text{st}} \text{ Subtrahend.}$$

$$75 \times 75 \times 300 = 1687500 = 2^{\text{d}} \text{ Triple square.}$$

$$75 \times 30 = 2250 = 2^{\text{d}} \text{ Triple quotient.}$$

$$1689750 = 2^{\text{d}} \text{ Divisor.}$$

$$1687500 \times 8 = 13500000.$$

$$2250 \times 8 \times 8 = 144000.$$

$$8 \times 8 \times 8 = 512.$$

$$13644512 = 2^{\text{d}} \text{ Subtrahend.}$$

$$758 \times 758 \times 300 = 172369200 = 3^{\text{d}} \text{ Triple square.}$$

$$758 \times 30 = 22740 = 3^{\text{d}} \text{ Triple quotient.}$$

$$172391940 = 3^{\text{d}} \text{ Divisor.}$$

$$172369200 \times 3 = 517107600.$$

$$22740 \times 3 \times 3 = 204660$$

$$3 \times 3 \times 3 = 27$$

$$517312287 = 3^{\text{d}} \text{ Subtrahend.}$$

2. What is the cube root of 34965783? Ans. 227.
3. What is the cube root of 84604519? Ans. 439.
4. What is the cube root of '008649? Ans. 2052+.
5. What is the cube root of $\frac{125}{343}$? Ans. $\frac{5}{7}$.

and place this product under the last ; under all, set the cube of the last quotient figure and call their sum the subtrahend.

7. Subtract the subtrahend from the dividend, and to the remainder bring down the next period for a new dividend, with which proceed as before, and so on till the whole be finished.

NOTE. The same rule must be observed for continuing the operation and pointing for decimals, as in the square root.

EXAMPLES.

1. Required the cube root of 436036824287.

436036824287 (7583 the root.
343

1st Divisor=14910)93036=1st Dividend.

73500
5250
125

78875=1st Subtrahend.

2d Divisor=1689750)14161824=2d Dividend.

13500000
144000
512

13644512=d Subtrahend.

3d Divisor=172391940)517312287=3d Dividend.

517107600
204660
27

517312287=3d Subtrahend.

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