4.1 Estimating Roots

MATH LAB

LESSON FOCUS Explore decimal representations of different roots of numbers.

Make Connections

Since $3^2 = 9$, 3 is a square root of 9.

We write: $3 = \sqrt{9}$

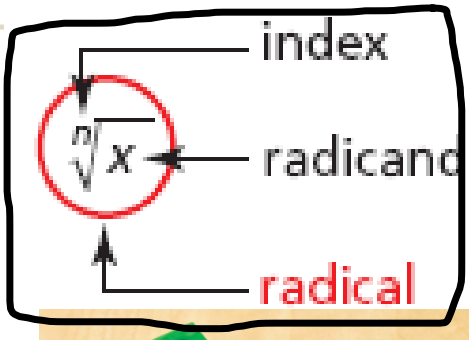
Since $3^3 = 27$, 3 is the cube root of 27.

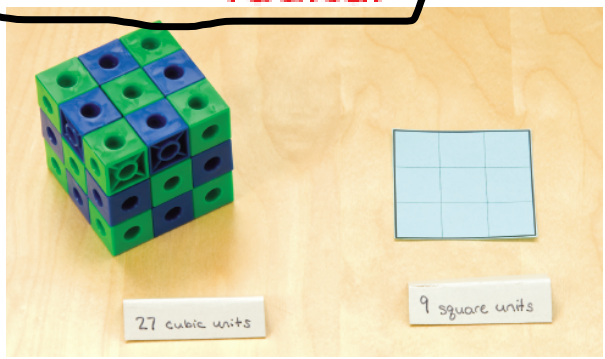
We write: $3 = \sqrt[3]{27}$

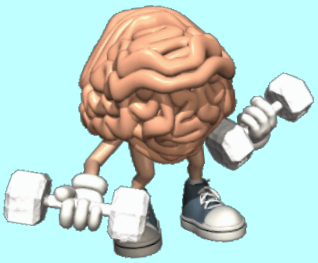
Since $3^4 = 81$, 3 is a fourth root of 81.

We write: $3 = \sqrt[4]{81}$

How would you write 5 as a square root? A cube root? A fourth root?







Warm Up

1) $12 - 6 \times 7 - (5-3)^2 + 24 \div 3$

$= 12 - 6 \times 7 - (2)^2 + 24 \div 3$

$= 12 - 6 \times 7 - 4 + 24 \div 3$

$= 12 - 42 - 4 + 24 \div 3$

$= 12 - 42 - 4 + 8$

$= -30 - 4 + 8$

$= -34 + 8$

$= -26$

2) To attend the local fair the cost for admission is $5.25. If you plan to go on rides it is an additional $2.00 per ticket. How many rides could you go on if you have $47.00?

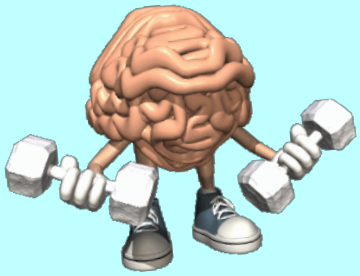
$\text{Cost} = 2t + 5.25$

$47 - 5.25 = 2t + 5.25 - 5.25$

$\frac{41.75}{2} = \frac{2t}{2}$

$20.875 = t$

Can only buy 20 tickets.



Warm Up

Review From Grade 9

1) $(2 + (5+1)^3 + (-2)^7) \div [2(-1+4^2)]$

2) $\frac{(6x14)}{7} + 100 \text{ x } 4 \div 5^2$

3) A taxi driver charges a flat fee of $9.00 and $3.00 for ever kilometre travelled.

a) Write an equation that represents the scenario.

b) If you travel 18 km how much would you have to pay the taxi driver? (use your equation from part a)

b) If you have $66.00 how far can you travel in the taxi? (use your equation from part a)

What do you know?!?!

$x^2 = x \cdot x$

$x^3 = x \cdot x \cdot x$

$x^4 = x \cdot x \cdot x \cdot x$

Let's try some examples:

a) $3^2 = 3 \cdot 3$
$= 9$

b) $4^3 = 4 \cdot 4 \cdot 4$
$= 64$

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

d) $\sqrt{49} = 7$

Exponent button

x^y or y^x or $\wedge$

x^2 x^3

$\sqrt{\ }$

$\sqrt{81} = 9$

Power
exponent
base

Exponents

- Exponents are shorthand for multiplication:
  $(5)\,(5) = 5^2$, $(5)\,(5)\,(5) = 5^3$.

- The "exponent" stands for however many times the term is being multiplied.

Exponent → 5^3 (3 times) $5 \times 5 \times 5 = 125$

- The term that's being multiplied is called the "base".

Base → 5^3