

# 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.

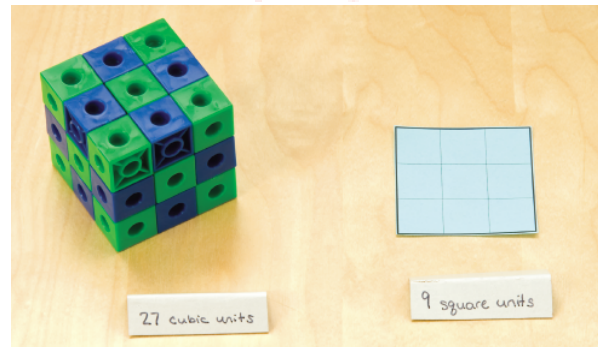
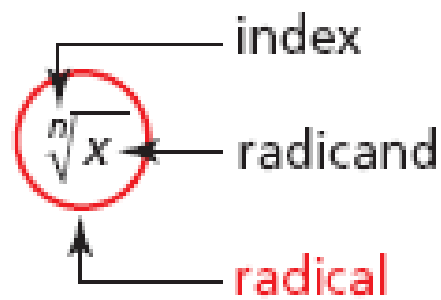
We write:  $3 = \sqrt[3]{27}$

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?

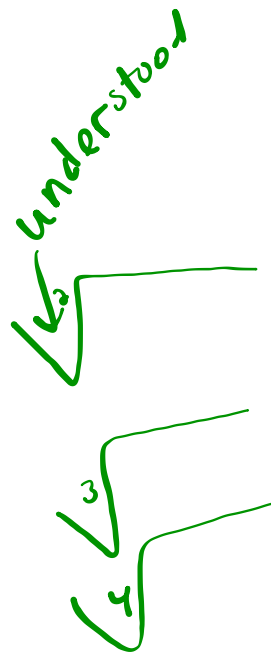
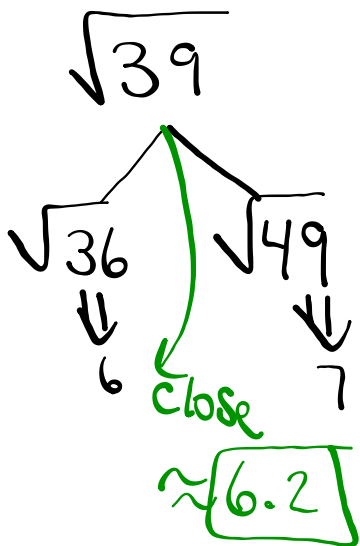


$$2 \left[ \begin{array}{l} A = 2^2 \\ = 4 \end{array} \right] 2$$

$$3 \left[ \begin{array}{l} A = 3^2 \\ = 9 \end{array} \right] 3$$

$$\begin{aligned} 1^2 &= 1 \\ 2^2 &= 4 \\ 3^2 &= 9 \\ 4^2 &= 16 \end{aligned}$$

$$\begin{aligned} &\vdots \\ &\vdots \\ &\vdots \\ 15^2 &= 225 \end{aligned}$$





# Warm Up

Bracketed  
Exponents  
Division  
Multiplication  
Add  
Subtract

$$\begin{aligned}
 1) & 12 - 6 \times 7 - (5-3)^2 + 24 \div 3 \\
 & = 12 - 6 \times 7 - \underbrace{(2)^2} + 24 \div 3 \\
 & = 12 - \underbrace{6 \times 7} - 4 + 24 \div 3 \\
 & = 12 - 42 - 4 + \underbrace{24 \div 3} \\
 & = \underbrace{12 - 42} - 4 + 8 \\
 & = \underbrace{-30} - 4 + 8 \\
 & = \underbrace{-34} + 8 \\
 & = -26
 \end{aligned}$$

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?

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

let  $x$  represent tickets

$$\$47.00 = 5.25 + 2x$$

*get alone*

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

$20.87 = x$

Can buy  
20 full tickets



# Warm Up

## Review From Grade 9

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

2)  $\frac{(6 \times 14)}{7} + 100 \times 4 \div 5^2$

$$\frac{84}{7} + 100 \times 4 \div 25$$

$$12 + \frac{100 \times 4}{25}$$

$$12 + 400 \div 25$$

$$12 + 16$$

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

a) Write an equation that  $C = 3k + 9$  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)

$$C = 3k + 9$$

$$= 3(18) + 9$$

$$= 54 + 9$$

$$= 63$$

You would pay the taxi driver \$63 for 18 km

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

$$C = 3k + 9$$

$$66 = 3k + 9$$

$$66 - 9 = 3k + 9 - 9$$

$$\frac{57}{3} = \frac{3k}{3}$$

$$19 = k$$

# with variable

Key words → for each  
for every  
per  
/

$$\begin{aligned} 1) & (2 + (5+1)^3 + (-2)^7) \div [2(-1+4^2)] \\ & (2 + \underbrace{(6)^3}_{\text{green}} + \underbrace{(-2)^7}_{\text{red}}) \div [2(-1 + \underbrace{4^2}_{\text{blue}})] \\ & (2 + 216 + -128) \div [2(-1 + 16)] \\ & (90) \div [2(15)] \\ & 90 \div 30 \\ & \boxed{3} \end{aligned}$$

$x^y$  $y^x$  $\wedge$  $2^3$ 

$$2 \boxed{\wedge}^3 = 8$$

$$2 \boxed{y^x}^3 = 8$$