Using the Feature of a Calculator

Use the following procedure to determine $\sqrt{10000}$ on a calculator.

- 1. Press
- 2. Press
- 4. Press 10 000 . 5. Press ENTER . The answer will be 10.



Use a calculator to evaluate.

- **b**) $\sqrt[7]{-2187}$ **c**) $-3\sqrt[4]{50625}$ = -3 = -45



Evaluate to the nearest hundredth.

Radicals

Numbers like $\sqrt{30}$, $\sqrt[3]{125}$, $\sqrt[4]{15}$, $\sqrt[6]{1000000}$ etc. are examples of **radicals**.

In fact, any expression of the form $\sqrt[n]{x}$, where $n \in \mathbb{N}$, is called a radical.

n is called the **index**. In a number like $\sqrt{30}$ the index is 2.

x is called the **radicand** and $\sqrt{}$ is called the **radical sign**.

If the index in a radical is even, then the radicand must be positive.



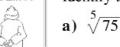


- When the index is not written in the radical, as in square root, it is assumed to be 2.
- The index is the number of times the radical must be multiplied by itself to equal the radicand.

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Identify the index and the radicand in each of the following.



b)
$$\sqrt{50}$$

c)
$$5\sqrt[3]{-\frac{1}{10}}$$

radicand:

index:

Review

Recall the following results from Lesson #1, Assignment Question #10.



$$\sqrt{9} \times \sqrt{4}$$
 is equal to $\sqrt{9 \times 4}$

$$\sqrt{9} + \sqrt{4}$$
 is **not** equal to $\sqrt{9+4}$

$$\sqrt{9 \div \sqrt{4}}$$
 is equal to $\sqrt{9 \div 4}$

$$\sqrt{9} - \sqrt{4}$$
 is **not** equal to $\sqrt{9-4}$

The calculations above are examples of some general rules involving radicals.

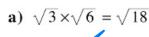


- The product(quotient) of the roots of two numbers is equal to the root of the i) product(quotient) of the two numbers.
- ii) The sum (difference) of the roots of two numbers is NOT equal to the root of the sum (difference) of the two numbers.

In general $\sqrt{a} \times \sqrt{b} = \sqrt{ab}$ where $a, b \ge 0$ and $\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$ where $a \ge 0, b > 0$.



State whether each statement is true or false.



$$\mathbf{b)} \ \frac{\sqrt{20}}{\sqrt{10}} = \sqrt{2}$$

a)
$$\sqrt{3} \times \sqrt{6} = \sqrt{18}$$
 b) $\frac{\sqrt{20}}{\sqrt{10}} = \sqrt{2}$ c) $\sqrt{16 + 9} = \sqrt{16} + \sqrt{9}$ 6 \neq 4+3



Write the following as a single radical in the form \sqrt{x} .



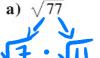
a)
$$\sqrt{8} \times \sqrt{3}$$

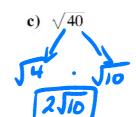
$$\mathbf{c)} \ \frac{\sqrt{50}}{\sqrt{10}}$$

a)
$$\sqrt{8} \times \sqrt{3}$$
 b) $\sqrt{7} \times 3$ c) $\frac{\sqrt{50}}{\sqrt{10}}$ d) $\frac{\sqrt{\sqrt{100}}}{\sqrt{2}} = \sqrt{5}$



Express as a product of radicals.





Complete Assignment Questions #3 - #13

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Assignment |#1-10|



- 1. Mentally evaluate, where possible, using the real number system.
 - a) $\sqrt{81}$
- **b**) $\sqrt[4]{81}$
- **c)** $5\sqrt[3]{27}$
- **d**) $\sqrt[5]{100\,000}$

- e) $\sqrt{\frac{16}{25}}$
- **f**) $\sqrt[4]{\frac{1}{16}}$ **g**) $4\sqrt{\frac{1}{16}}$
- **h**) $-\sqrt{1}$

- i) $\sqrt{-1}$
- **j**) $\sqrt[5]{-1}$ **k**) $7\sqrt[3]{-125}$

- **m**) $3\sqrt{144}$
- **n**) $\frac{1}{2}\sqrt[5]{32}$ **o**) $-\sqrt[11]{-1}$
- **p**) $\sqrt[3]{-\frac{8}{27}}$

- 2. State whether the following are true or false.
 - a) The square roots of 25 are ± 5 .
 - **b**) $\sqrt{25} = \pm 5$
 - c) If $x^2 = 25, x \in R$, then $x = \pm 5$.
- 3. Use a calculator to evaluate.

a)
$$\sqrt[4]{4096}$$

b)
$$\sqrt[5]{-243}$$

c)
$$-\sqrt[4]{2401}$$

d)
$$-\sqrt[3]{729}$$

d)
$$-\sqrt[3]{729}$$
 e) $\sqrt[3]{-729}$

f)
$$-8\sqrt[4]{\frac{1}{256}}$$

g)
$$4\sqrt[6]{0.015625}$$

h)
$$\sqrt[4]{-6.561}$$

i)
$$\frac{3}{2}\sqrt[4]{\frac{16}{81}}$$

4. Evaluate to the nearest hundredth.

a)
$$\sqrt{10}$$

b)
$$\sqrt[8]{29}$$

c)
$$-\frac{3}{2}\sqrt[9]{-527}$$

5. Evaluate to the nearest tenth.

a)
$$\sqrt[5]{-25}$$

b)
$$-5\sqrt[4]{169}$$

c)
$$\frac{1}{2}\sqrt[3]{-81}$$