

Warm Up

1. Order the following radicals from least to greatest use chart

$\sqrt{22}$	$\sqrt[3]{-10}$	$\sqrt[4]{256}$	$\sqrt[5]{-32}$	$\sqrt[3]{-10}$
4.7	-2.2	4	-2	$\sqrt[5]{-32}$



$$\sqrt[4]{256}$$

$$\sqrt{22}$$

2. Reduce each radical: show work

a) $\sqrt{128}$

$$\sqrt{64 \times 2}$$

$$\sqrt{64} \times \sqrt{2}$$

$$8\sqrt{2}$$

Fully reduced

$$\sqrt{16 \times 8}$$

$$\sqrt{16} \times \sqrt{8}$$

$$4\sqrt{8} \leftarrow \text{further reduce}$$

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

$$4 \cdot 2\sqrt{2}$$

$$8\sqrt{2}$$

b) $\sqrt[3]{162}$

$$\sqrt[3]{27 \times 6}$$

$$\sqrt[3]{27} \times \sqrt[3]{6}$$

$$3\sqrt[3]{6}$$

(tree)

homework solutions

Grade 10

Page 218

Questions 4, 7a, 8a, 9, 10, 11

$$\begin{aligned} 4a) \sqrt{8} &= \sqrt{(4)(2)} \\ &= \sqrt{4} \sqrt{2} \\ &= 2\sqrt{2} \end{aligned}$$

$$\begin{aligned} 4b) \sqrt{12} &= \sqrt{(4)(3)} \\ &= \sqrt{4} \sqrt{3} \\ &= 2\sqrt{3} \end{aligned}$$

$$\begin{aligned} 4c) \sqrt{32} &= \sqrt{(16)(2)} \\ &= \sqrt{16} \sqrt{2} \\ &= 4\sqrt{2} \end{aligned}$$

$$\begin{aligned} 4d) \sqrt{50} &= \sqrt{(25)(2)} \\ &= \sqrt{25} \sqrt{2} \\ &= 5\sqrt{2} \end{aligned}$$

$$\begin{aligned} 4e) \sqrt{18} &= \sqrt{(9)(2)} \\ &= \sqrt{9} \sqrt{2} \\ &= 3\sqrt{2} \end{aligned}$$

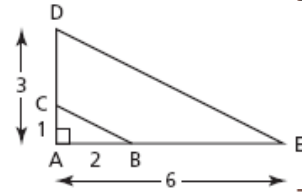
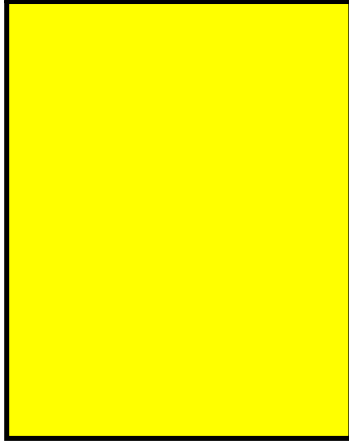
$$\begin{aligned} 4f) \sqrt{27} &= \sqrt{(9)(3)} \\ &= \sqrt{9} \sqrt{3} \\ &= 3\sqrt{3} \end{aligned}$$

$$\begin{aligned} 4g) \sqrt{48} &= \sqrt{(16)(3)} \\ &= \sqrt{16} \sqrt{3} \\ &= 4\sqrt{3} \end{aligned}$$

$$\begin{aligned} 4h) \sqrt{75} &= \sqrt{(25)(3)} \\ &= \sqrt{25} \sqrt{3} \\ &= 5\sqrt{3} \end{aligned}$$

homework solutions

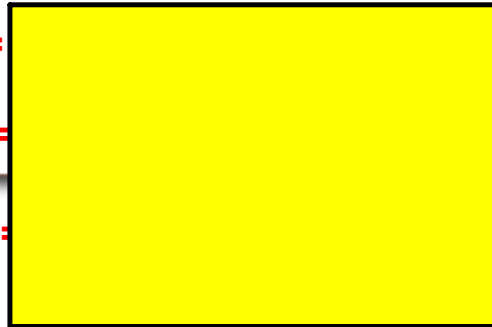
7. a) Use the diagram to explain why $\sqrt{45} = 3\sqrt{5}$.



$$\begin{aligned}
 c^2 &= a^2 + b^2 \\
 c &= \sqrt{a^2 + b^2} \\
 &= \sqrt{6^2 + 3^2} \\
 &= \sqrt{36 + 9} \\
 c &= \sqrt{45}
 \end{aligned}$$

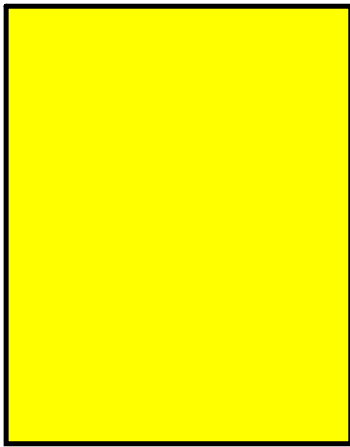
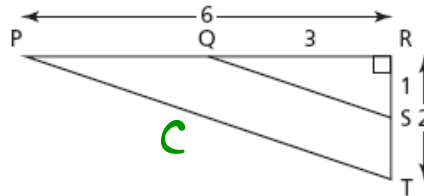
b) Use algebra to verify that $\sqrt{45} = 3\sqrt{5}$.

$$\sqrt{45} =$$



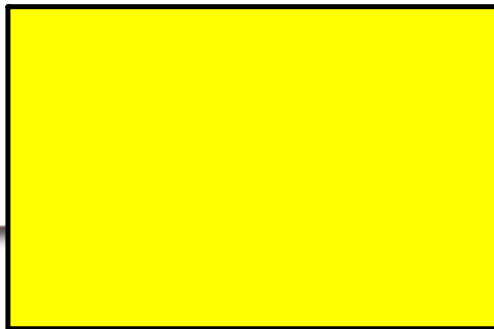
homework solutions

8. a) Use the diagram to explain why $\sqrt{40} = 2\sqrt{10}$.



$$\begin{aligned}c &= \sqrt{a^2 + b^2} \\ &= \sqrt{6^2 + 2^2} \\ &= \sqrt{36 + 4} \\ c &= \sqrt{40}\end{aligned}$$

b) Use algebra to verify that $\sqrt{40} = 2\sqrt{10}$.



homework solutions

9) Rewriting $\sqrt{50}$ as $\sqrt{25} \cdot \sqrt{2}$ helps you simplify $\sqrt{50}$ since you can take the square root of the perfect square 25. You cannot take the square root of either 10 or 5 so rewriting $\sqrt{50}$ as $\sqrt{10} \cdot \sqrt{5}$ does not help. You need one number to be a perfect square number.

$$\begin{aligned} 10a) \quad \sqrt{90} &= \sqrt{(9)(10)} \\ &= \sqrt{9} \cdot \sqrt{10} \\ &= \boxed{3\sqrt{10}} \end{aligned}$$

$$\begin{aligned} 10b) \quad \sqrt{73} &= \sqrt{(9)(7)} \\ &= \sqrt{9} \cdot \sqrt{7} \\ &= \boxed{3\sqrt{7}} \end{aligned}$$

$$\begin{aligned} 10c) \quad \sqrt{108} &= \sqrt{(36)(3)} \\ &= \sqrt{36} \cdot \sqrt{3} \\ &= \boxed{6\sqrt{3}} \end{aligned}$$

$$\begin{aligned} 10d) \quad \sqrt{600} &= \sqrt{(100)(6)} \\ &= \sqrt{100} \cdot \sqrt{6} \\ &= \boxed{10\sqrt{6}} \end{aligned}$$

$$\begin{aligned} 10e) \quad \sqrt{54} &= \sqrt{(9)(6)} \\ &= \sqrt{9} \cdot \sqrt{6} \\ &= \boxed{3\sqrt{6}} \end{aligned}$$

$$10f) \quad \sqrt{91}$$

Already in simplest form.

homework solutions

$$\begin{aligned}
 10g) \quad \sqrt{28} &= \sqrt{(4) \cdot (7)} \\
 &= \sqrt{4} \cdot \sqrt{7} \\
 &= \boxed{2\sqrt{7}}
 \end{aligned}$$

$$\begin{aligned}
 10h) \quad \sqrt{33} \\
 \text{Already in simplest form}
 \end{aligned}$$

$$\begin{aligned}
 10i) \quad \sqrt{112} &= \sqrt{(16) \cdot (7)} \\
 &= \sqrt{16} \cdot \sqrt{7} \\
 &= \boxed{4\sqrt{7}}
 \end{aligned}$$

$$\begin{aligned}
 * 11a) \quad \sqrt[3]{16} &= \sqrt[3]{(8)(2)} \\
 &= \sqrt[3]{8} \cdot \sqrt[3]{2} \\
 &= \boxed{2\sqrt[3]{2}}
 \end{aligned}$$

$$\begin{aligned}
 * 11b) \quad \sqrt[3]{81} &= \sqrt[3]{(27)(3)} \\
 &= \sqrt[3]{27} \cdot \sqrt[3]{3} \\
 &= \boxed{3\sqrt[3]{3}}
 \end{aligned}$$

$$\begin{aligned}
 * 11c) \quad \sqrt[3]{256} &= \sqrt[3]{(64)(4)} \\
 &= \sqrt[3]{64} \cdot \sqrt[3]{4} \\
 &= \boxed{4\sqrt[3]{4}}
 \end{aligned}$$

$$\begin{aligned}
 11d) \quad \sqrt[3]{128} &= \sqrt[3]{(64) \cdot (2)} \\
 &= \sqrt[3]{64} \cdot \sqrt[3]{2} \\
 &= \boxed{4\sqrt[3]{2}}
 \end{aligned}$$

homework solutions

11e) $\sqrt[3]{60} =$

Already in Simplest form

11f) $\sqrt[3]{192} = \sqrt[3]{(64)(3)}$

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

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

11g) $\sqrt[3]{135} = \sqrt[3]{(27)(5)}$

$= \sqrt[3]{27} \cdot \sqrt[3]{5}$

$= 3 \sqrt[3]{5}$

11h) $\sqrt[3]{100} =$

Already in Simplest form

11i) $\sqrt[3]{500} = \sqrt[3]{(125)(4)}$

$= \sqrt[3]{125} \cdot \sqrt[3]{4}$

$= 5 \sqrt[3]{4}$

11j) $\sqrt[3]{375} = \sqrt[3]{(125)(3)}$

$= \sqrt[3]{125} \cdot \sqrt[3]{3}$

$= 5 \sqrt[3]{3}$

Use either prime factorization or product of n^{th} factors

2. Write each radical in simplest form, if possible.

a) $\sqrt{30}$

b) $\sqrt[3]{32}$

c) $\sqrt[4]{48}$



d) $\sqrt[3]{375}$

Mixed to Entire

Express as a
reduced
mixed radical.

$$5\sqrt{18}$$

Entire Radicals
(mixed \Rightarrow entire)

mixed	entire
$a^n \sqrt[n]{b}$	$\sqrt[(a^n) * b]$

Express as an entire radical.

Mixed $3\sqrt{5}$ *understood*

$$= \sqrt{3^2 \times 5}$$

$$= \sqrt{9 \times 5}$$

$$= \sqrt{45}$$

Express as an entire radical.

$$2^4 \sqrt[4]{7}$$

$$= \sqrt[4]{2^4 \times 7}$$

$$= \sqrt[4]{16 \times 7}$$

$$= \sqrt[4]{112}$$

Mixed to Entire

$$\begin{array}{l} 3\sqrt[5]{2} \\ = \sqrt[5]{3^5 \times 2} \\ = \sqrt[5]{243 \times 2} \\ = \sqrt[5]{486} \end{array} \left. \begin{array}{l} 7\sqrt[3]{-4} \\ = \sqrt[3]{7^3 \times -4} \\ = \sqrt[3]{343 \times (-4)} \\ = \sqrt[3]{-1372} \end{array} \right\} \begin{array}{l} 2\sqrt[4]{5} \\ = \sqrt[4]{2^4 \times 5} \\ = \sqrt[4]{16 \times 5} \\ = \sqrt[4]{80} \end{array}$$

1

Can this number be simplified?

A Yes

B No

Simplify, (Reduce) \Rightarrow (Entire \rightarrow Mix)

$$\sqrt{27}$$

Chart
and
÷
•



Quiz Outline

1) Evaluate

$$\sqrt[3]{2197}$$

$$= 13$$

2) Estimate (show work)

$$\sqrt[3]{500}$$

#3) Entire to Mixed

$$\begin{aligned} & \sqrt[3]{250} \\ &= \sqrt[3]{125 \times 2} \\ &= \sqrt[3]{125} \times \sqrt[3]{2} \\ &= 5 \sqrt[3]{2} \end{aligned}$$

Quiz _____

#4 Mixed to Entire

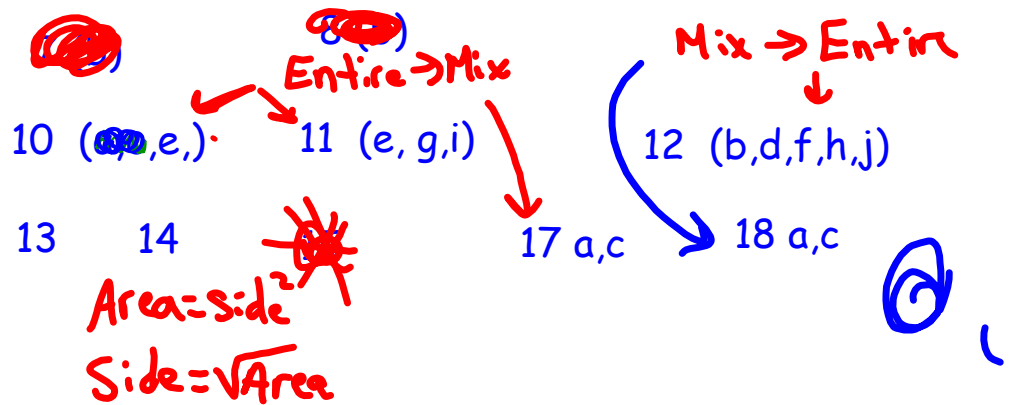
$$\begin{aligned} & \sqrt[3]{5} \\ &= \sqrt[3]{(3^4) \times 5} \\ & \sqrt[4]{\quad} \end{aligned}$$

Homework

Quiz Wednesday

Page: 218-219

Questions:



19-23