

Quiz Wednesday

Warm Up

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

$\sqrt{22}$	$\sqrt[3]{-10}$	$\sqrt[4]{256}$	$\sqrt[5]{-32}$
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Reduce each radical: show work

a) $\sqrt{128}$

$\sqrt{64 \times 2}$
 Separate
 $\sqrt{64} \times \sqrt{2}$
 $8\sqrt{2}$

- 4
- 9
- 16
- 25
- 36
- 49
- 64
- 81
- 100
- 121 ←
- 144

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

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

- 1
- 8
- 27 ←
- 64
- 125 ← 12
- 216

homework solutions

Grade 10

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

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

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

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

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

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

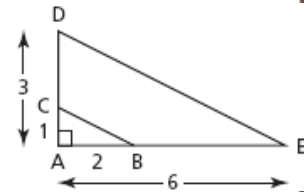
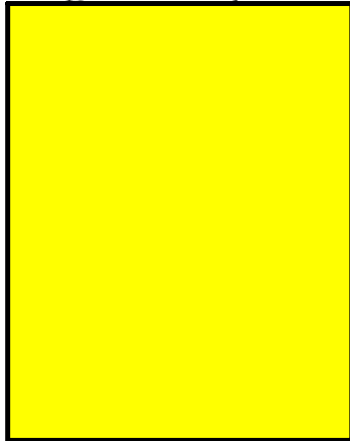
$$\begin{aligned}4f) \sqrt{27} &= \sqrt{(9)(3)} \\ &= \sqrt{9} \sqrt{3} \\ &= 3\sqrt{3}\end{aligned}$$

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

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

homework solutions

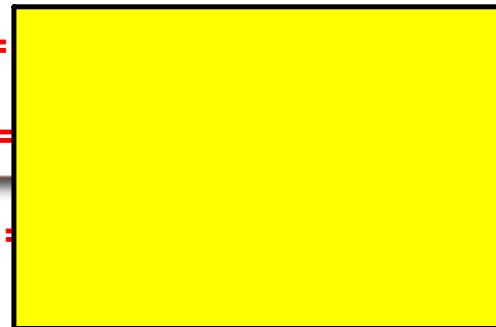
7. a) Use the diagram to explain why $\sqrt{45} = 3\sqrt{5}$.



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

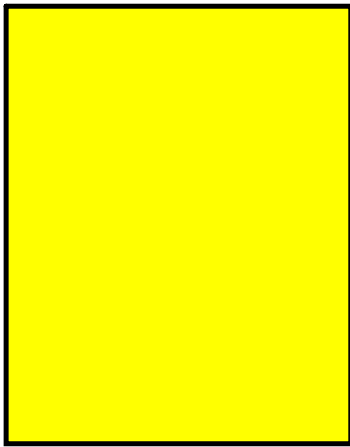
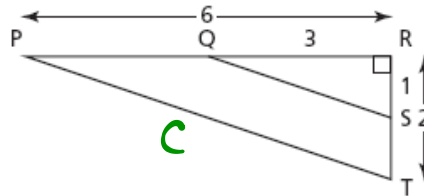
b) Use algebra to verify that $\sqrt{45} = 3\sqrt{5}$.

$$\sqrt{45} =$$



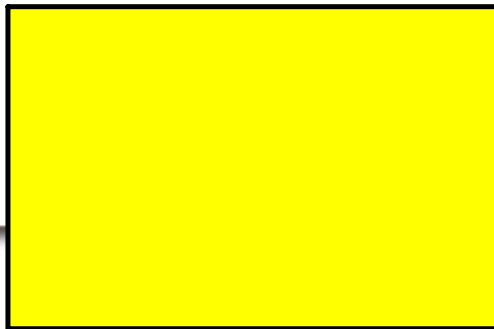
homework solutions

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

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

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

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

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

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

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

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

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)

$$\text{mixed } a \sqrt[n]{b} \rightarrow \text{entire } \sqrt[n]{(a^n) \cdot b}$$

Express as an entire radical.

Mixed

$$3\sqrt{5}$$

understood
'2' as
index

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

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

entire = $\sqrt{45}$

Express as an entire radical.

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

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

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

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

Mixed to Entire

$$3\sqrt[5]{2}$$

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

$$= \sqrt[5]{243 \times 2}$$

$$= \sqrt[5]{486}$$

$$7\sqrt[3]{-4}$$

$$= \sqrt[3]{7^3 \times -4}$$

$$= \sqrt[3]{343 \times -4}$$

$$= \sqrt[3]{-1372}$$

$$2\sqrt[4]{5}$$

$$= \sqrt[4]{2^4 \times 5}$$

$$= \sqrt[4]{16 \times 5}$$

$$= \sqrt[4]{80}$$

1

Can this number
be simplified?

(Entire \rightarrow Mixed)

A

Yes

B

No

$$\begin{aligned} &\sqrt{27} \\ &\sqrt{9 \times 3} \\ &\sqrt{9} \times \sqrt{3} \\ &3\sqrt{3} \end{aligned}$$



Quiz Outline

1) Evaluate

$$\sqrt[3]{2197} = 13$$

2) Estimate (show work)

$$\begin{array}{c} \sqrt[3]{500} \\ \swarrow \quad \searrow \\ \sqrt[3]{343} \quad \sqrt[3]{512} \\ \downarrow \quad \downarrow \\ 7 \quad 8 \\ \text{Closer} \\ \approx 7.8 \end{array}$$

#3) Entire to Mixed

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

Wednesday
Quiz ~~Friday~~

#4 Mixed to Entire

$$\begin{aligned} & 3\sqrt[4]{5} \\ &= \sqrt[4]{(3^4) \times 5} \\ &= \sqrt[4]{81 \times 5} \\ &= \sqrt[4]{405} \end{aligned}$$

Homework

Quiz ~~Friday~~ ^{wednesday}

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Questions: ^{7b)} $\sqrt{45}$ ^{8b)} $\sqrt{40}$
7 (b) $\sqrt{a \times s}$ $\sqrt{a \times s}$ 8 (b)
10 (a, e,) ^{3 $\sqrt{5}$} 11 (e, g, i) 12 (b, d, f, h, j)
13 14 15 17 a, c 18 a, c
 \Downarrow
Side = $\sqrt{\text{Area}}$

19-23