Homework Solutions

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Questions:

7 (b) 8 (b)

10 (a,c,e,) 11 (e, g,i) 12 (a,c,e,g,i)

13 14 15 17 a,c 18 a,c

19-23

10a) $\sqrt{90} = \sqrt{(9)(10)}$
$= \sqrt{9} \cdot \sqrt{10}$
$= 3\sqrt{10}$

10b) $\sqrt{73} = \sqrt{(9)(7)}$
$= \sqrt{9} \cdot \sqrt{7}$
$= 3\sqrt{7}$

10c) $\sqrt{108} = \sqrt{(36)(3)}$
$= \sqrt{36} \cdot \sqrt{3}$
$= 6\sqrt{3}$

10d) $\sqrt{600} = \sqrt{(100)\cdot(6)}$
$= \sqrt{100} \cdot \sqrt{6}$
$= 10\sqrt{6}$

10e) $\sqrt{54} = \sqrt{(9)(6)}$
$= \sqrt{9} \cdot \sqrt{6}$
$= 3\sqrt{6}$

10f) $\sqrt{91}$
Already in Simplest form.

10g) $\sqrt{28} = \sqrt{(4)\cdot(7)}$

$= \sqrt{4}\cdot\sqrt{7}$

$= 2\sqrt{7}$

10h) $\sqrt{33}$

Already in Simplest form

10i) $\sqrt{112} = \sqrt{(16)(7)}$

$= \sqrt{16}\cdot\sqrt{7}$

$= 4\sqrt{7}$

11a) $\sqrt[3]{16} = \sqrt[3]{(8)(2)}$

$= \sqrt[3]{8}\cdot\sqrt[3]{2}$

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

11b) $\sqrt[3]{81} = \sqrt[3]{(27)(3)}$

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

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

11c) $\sqrt[3]{256} = \sqrt[3]{(64)(4)}$

$= \sqrt[3]{64}\cdot\sqrt[3]{4}$

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

11d) $\sqrt[3]{128} = \sqrt[3]{(64)\cdot(2)}$

$= \sqrt[3]{64}\cdot\sqrt[3]{2}$

$= 4\sqrt[3]{2}$

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

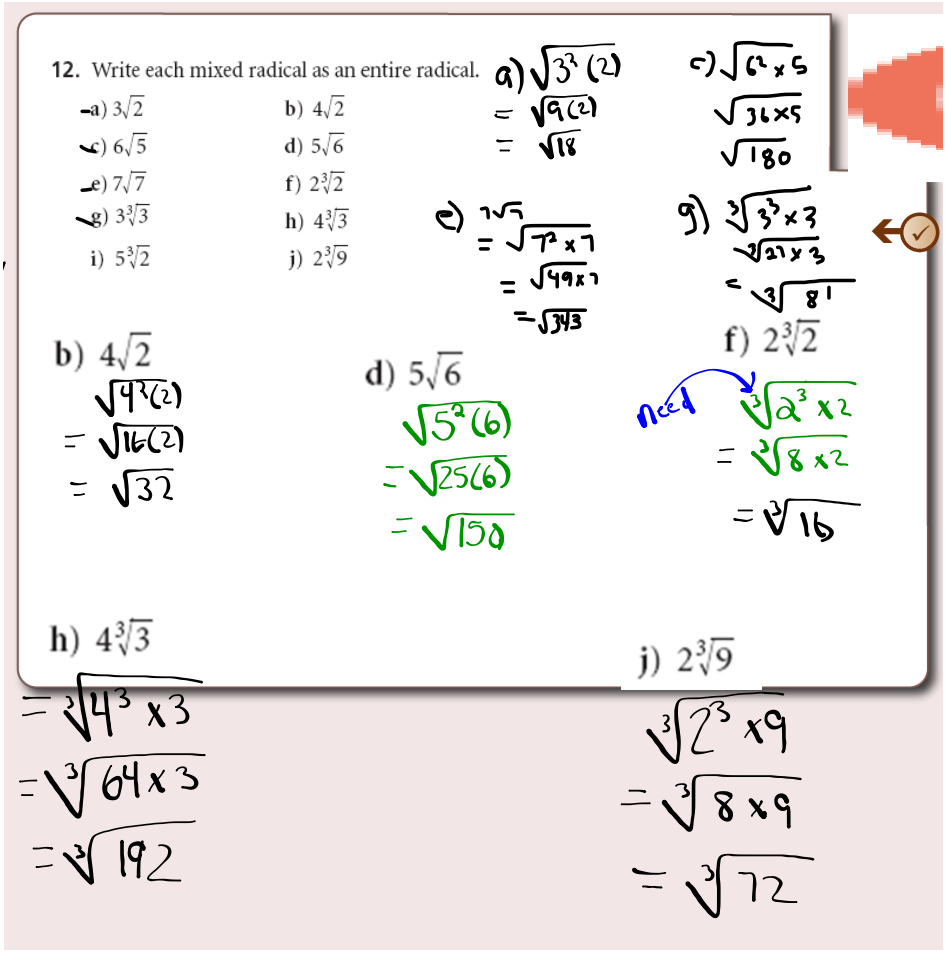
$= \sqrt[3]{125}\cdot\sqrt[3]{4}$

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

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

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

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



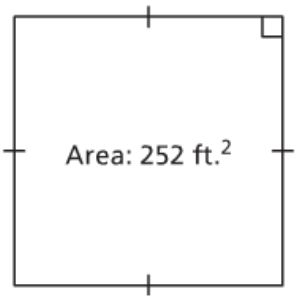
13. a) Can every mixed radical be expressed as an entire radical?

yes $x\sqrt[n]{y} = \sqrt{(x^n)y}$

b) Can every entire radical be expressed as a mixed radical? No $\sqrt{13}$

Give examples to support your answers.

14. Express the side length of this square as a radical in simplest form.



$$\text{side} = \sqrt{\text{area}}$$
$$= \sqrt{252\ ft^2}$$
$$= \sqrt{36 \times 7}$$
$$= \sqrt{36} \times \sqrt{7}$$
$$= 6\sqrt{7}\ ft$$

15. A cube has a volume of 200 cm^3. Write the edge length of the cube as a radical in simplest form.

$$\sqrt[3]{200}$$
$$= \sqrt[3]{8 \times 25}$$
$$\sqrt[3]{8} \cdot \sqrt[3]{25}$$
$$= 2\sqrt[3]{25}$$

x didn't do

16. A square has an area of 54 square inches. Determine the perimeter of the square. Write the answer as a radical in simplest form.

side $= \sqrt{\text{area}}$

$= \sqrt{54}$

$= \sqrt{9 \times 6}$

$\sqrt{9} \cdot \sqrt{6}$

side $= 3\sqrt{6}$

$P = s + s + s + s$ or for square $4s$

$= 4 \cdot (3\sqrt{6})$

$= 12\sqrt{6}$

17. Write each radical in simplest form.

* **a)** $\sqrt[4]{48}$

$= \sqrt[4]{16 \times 3}$

$\sqrt[4]{16} \times \sqrt[4]{3}$

$= 2\sqrt[4]{3}$

b) $\sqrt[4]{405}$

* **c)** $\sqrt[4]{1250}$

$\sqrt[4]{625 \times 2}$

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

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

$5\sqrt[4]{2}$

d) $\sqrt[4]{176}$

18. Write each mixed radical as an entire radical.

a) $6\sqrt[4]{3}$

$\sqrt[4]{6^4 \times 3}$

$\sqrt[4]{1296 \times 3}$

$= \sqrt[4]{3888}$

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

c) $3\sqrt[5]{4}$

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

$= \sqrt[5]{243 \times 4}$

$= \sqrt[5]{972}$

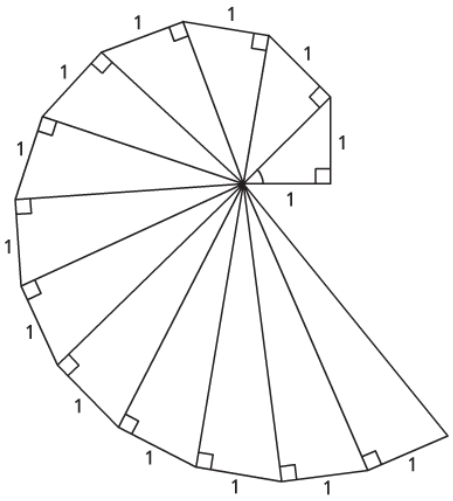
d) $4\sqrt[5]{3}$

a) Calculate the length of the hypotenuse of each triangle. Write each length as an entire radical.

b) **i)** What pattern do you see in the lengths?

ii) Use this pattern to predict the length of the hypotenuse of the 50th triangle.

iii) How many of the first 100 triangles have hypotenuse lengths that can be written as mixed radicals? Justify your answer.



20. Here is a student's solution for writing $8\sqrt[3]{2}$ as an entire radical.

$$\begin{aligned} 8\sqrt[3]{2} &= 8 \cdot \sqrt[3]{2} \\ &= \sqrt[3]{2} \cdot \sqrt[3]{2} \\ &= \sqrt[3]{2 \cdot 2} \\ &= \sqrt[3]{4} \end{aligned}$$

Identify an error the student made, then write the correct solution.

21. A student simplified $\sqrt{96}$ as shown:

$$\begin{aligned} \sqrt{96} &= \sqrt{4} \cdot \sqrt{48} \\ &= 2 \cdot \sqrt{48} \\ &= 2 \cdot \sqrt{8} \cdot \sqrt{6} \\ &= 2 \cdot 4 \cdot \sqrt{6} \\ &= 8\sqrt{6} \end{aligned}$$

Identify the errors the student made, then write a correct solution.

23. Simplify the radicals in each list.
What patterns do you see in the results?
Write the next 2 radicals in each list.

a) $\sqrt{4}$

$\sqrt{400}$

$\sqrt{40\,000}$

c) $\sqrt{8}$

$\sqrt{800}$

$\sqrt{80\,000}$

b) $\sqrt[3]{27}$

$\sqrt[3]{27\,000}$

$\sqrt[3]{27\,000\,000}$

d) $\sqrt[3]{24}$

$\sqrt[3]{24\,000}$

$\sqrt[3]{24\,000\,000}$