Exercises

A

3. List all the perfect squares up to 400, and their square roots.

4. Write each radical in simplest form.

a) $\sqrt{8}$ b) $\sqrt{12}$ c) $\sqrt{32}$ d) $\sqrt{50}$

e) $\sqrt{18}$ f) $\sqrt{27}$ g) $\sqrt{48}$ h) $\sqrt{75}$

5. Write each mixed radical as an entire radical.

a) $5\sqrt{2}$ b) $6\sqrt{2}$ c) $7\sqrt{2}$ d) $8\sqrt{2}$

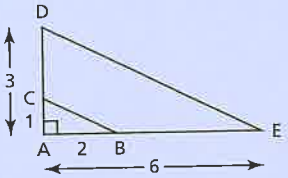
e) $5\sqrt{3}$ f) $6\sqrt{3}$ g) $7\sqrt{3}$ h) $8\sqrt{3}$

6. a) List all the perfect cubes up to 1000, and their cube roots.

b) List all the perfect fourth powers up to 1000, and their fourth roots.

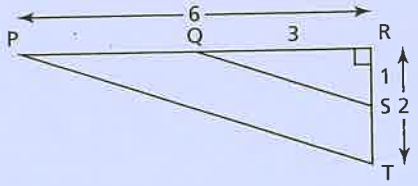
B

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



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

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



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

9. Explain why rewriting $\sqrt{50}$ as $\sqrt{25} \cdot \sqrt{2}$ helps you simplify $\sqrt{50}$, but rewriting $\sqrt{50}$ as $\sqrt{10} \cdot \sqrt{5}$ does not.

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

a) $\sqrt{90}$ b) $\sqrt{73}$ c) $\sqrt{108}$

d) $\sqrt{600}$ e) $\sqrt{54}$ f) $\sqrt{91}$

g) $\sqrt{28}$ h) $\sqrt{33}$ i) $\sqrt{112}$

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

a) $\sqrt[3]{16}$ b) $\sqrt[3]{81}$

c) $\sqrt[3]{256}$ d) $\sqrt[3]{128}$

e) $\sqrt[3]{60}$ f) $\sqrt[3]{192}$

g) $\sqrt[3]{135}$ h) $\sqrt[3]{100}$

i) $\sqrt[3]{500}$ j) $\sqrt[3]{375}$

12. Write each mixed radical as an entire radical.

a) $3\sqrt{2}$ b) $4\sqrt{2}$

c) $6\sqrt{5}$ d) $5\sqrt{6}$

e) $7\sqrt{7}$ f) $2\sqrt[3]{2}$

g) $3\sqrt[3]{3}$ h) $4\sqrt[3]{3}$

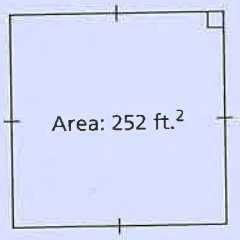
i) $5\sqrt[3]{2}$ j) $2\sqrt[3]{9}$

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

b) Can every entire radical be expressed as a mixed radical?

Give examples to support your answers.

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



15. A cube has a volume of 200 cm³. Write the edge length of the cube as a radical in simplest form.

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.

17. Write each radical in simplest form.

a) $\sqrt[4]{48}$ b) $\sqrt[4]{405}$

c) $\sqrt[4]{1250}$ d) $\sqrt[4]{176}$

18. Write each mixed radical as an entire radical.

a) $6\sqrt[4]{3}$ b) $7\sqrt[4]{2}$

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

4.3 Mixed and Entire Radicals, page 218

3.

Perfect square	Square root
1	1
4	2
9	3
16	4
25	5
36	6
49	7
64	8
81	9
100	10
121	11
144	12
169	13
196	14
225	15
256	16
289	17
324	18
361	18
400	20

4. a) $2\sqrt{2}$ **b)** $2\sqrt{3}$
c) $4\sqrt{2}$ **d)** $5\sqrt{2}$
e) $3\sqrt{2}$ **f)** $3\sqrt{3}$
g) $4\sqrt{3}$ **h)** $5\sqrt{3}$

5. a) $\sqrt{50}$ **b)** $\sqrt{72}$
c) $\sqrt{98}$ **d)** $\sqrt{128}$
e) $\sqrt{75}$ **f)** $\sqrt{108}$
g) $\sqrt{147}$ **h)** $\sqrt{192}$

6. a)

Perfect cube	Cube root
1	1
8	2
27	3
64	4
125	5
216	6
343	7
512	8
729	9
1000	10

b)

Perfect fourth power	Fourth root
1	1
16	2
81	3
256	4
625	5

9. 25 is a perfect square, but neither 10 nor 5 is a perfect square.

10. a) $3\sqrt{10}$ **b)** Cannot be simplified
c) $6\sqrt{3}$ **d)** $10\sqrt{6}$
e) $3\sqrt{6}$ **f)** Cannot be simplified
g) $2\sqrt{7}$ **h)** Cannot be simplified
i) $4\sqrt{7}$

11. a) $2\sqrt[3]{2}$ **b)** $3\sqrt[3]{3}$
c) $4\sqrt[3]{4}$ **d)** $4\sqrt[3]{2}$
e) Cannot be simplified **f)** $4\sqrt[3]{3}$
g) $3\sqrt[3]{5}$ **h)** Cannot be simplified
i) $5\sqrt[3]{4}$ **j)** $5\sqrt[3]{3}$