

**Chapter 8**  
**Form E**

For problems 1 – 3, find the indicated root, or state that the expression is not a real number.

1.  $\sqrt{169}$   
 a. 14                      b. 13                      c. 12                      d. Not a real number
2.  $\sqrt{25}$   
 a. 5                        b. -5                      c. 25                      d. Not a real number
3.  $\sqrt[3]{-64}$   
 a. -4                      b. 4                        c. -8                      d. Not a real number

For problems 4 – 6, simplify by first writing the expression in radical form.

4.  $256^{\frac{1}{2}}$   
 a.  $\sqrt{256} = 16$             b.  $\frac{1}{\sqrt{256}} = \frac{1}{16}$             c.  $\frac{1}{2}(256) = 128$             d.  $\frac{1}{(256)^2} = \frac{1}{65536}$
5.  $-16^{\frac{5}{4}}$   
 a.  $-(\sqrt[4]{16})^5 = -32$             b.  $\frac{1}{(\sqrt[4]{16})^5} = \frac{1}{32}$             c.  $\frac{1}{\frac{5}{4}(\sqrt{16})} = \frac{1}{5}$             d. Not a real number
6.  $64^{\frac{4}{3}}$   
 a.  $(\sqrt[4]{64})^3 = 22.63$             b.  $\frac{1}{(\sqrt[3]{64})^4} = \frac{1}{256}$             c.  $(\sqrt[3]{64})^4 = 256$             d.  $\frac{4}{3}(\sqrt{64}) = \frac{32}{3}$

For problems 7 – 9, simplify each expression.

7.  $8\sqrt{24}$   
 a.  $16\sqrt{3}$                       b.  $32\sqrt{6}$                       c.  $16\sqrt{6}$                       d.  $32\sqrt{3}$
8.  $\sqrt{192x^{25}}$   
 a.  $14x^5$                         b.  $8x^5\sqrt{3}$                       c.  $14x^{12}\sqrt{3x}$                       d.  $8x^{12}\sqrt{3x}$
9.  $\sqrt[3]{250x^8}$   
 a.  $5x^4\sqrt{10}$                       b.  $5x^2\sqrt[3]{2x^2}$                       c.  $5x^2\sqrt[3]{2}$                       d.  $5x^2\sqrt[3]{10x^2}$

For problems 10 – 19, perform the indicated operation and , if possible, simplify.

10.  $\sqrt{8} \cdot \sqrt{5}$

a.  $10\sqrt{2}$

b.  $2\sqrt{10}$

c.  $4\sqrt{10}$

d.  $2\sqrt{20}$

11.  $\sqrt[3]{9} \cdot \sqrt[3]{12}$

a.  $3\sqrt[3]{12}$

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

c.  $3\sqrt[3]{4}$

d. 6

12.  $\sqrt{\frac{11}{5}} \cdot \sqrt{\frac{55}{5}}$

a.  $\frac{\sqrt{605}}{5}$

b.  $\frac{11}{\sqrt{5}}$

c. 11

d.  $\frac{11\sqrt{5}}{5}$

13.  $\frac{\sqrt{40x^4}}{\sqrt{x}}$

a.  $2\sqrt{10x^3}$

b.  $\frac{2x^2\sqrt{10x}}{x}$

c.  $2x\sqrt{10x}$

d.  $4\sqrt{10x^3}$

14.  $\sqrt{15x^3} \cdot \sqrt{20x^3}$

a.  $10x^3\sqrt{3}$

b.  $10x^4\sqrt{3x}$

c.  $100x^3\sqrt{3}$

d.  $100x^4\sqrt{3x}$

15.  $12\sqrt{12} + 2\sqrt{27} - 5\sqrt{75}$

a.  $23\sqrt{3} + 6$

b.  $5\sqrt{3}$

c.  $41\sqrt{3}$

d.  $9\sqrt{-36}$

16.  $\sqrt{5}(4\sqrt{5} - 2\sqrt{3})$

a.  $4\sqrt{10} - 2\sqrt{8}$

b.  $100 - 2\sqrt{3}\sqrt{5}$

c.  $2\sqrt{10}$

d.  $20 - 2\sqrt{15}$

17.  $(8\sqrt{3} + 4)(3\sqrt{3} - 2)$

a.  $60\sqrt{3}$

b.  $64 - 4\sqrt{3}$

c.  $64 + 4\sqrt{3}$

d.  $68\sqrt{3}$

18.  $(4 + 2\sqrt{5})(4 - 2\sqrt{5})$

a. 60

b. -4

c. 4

d. 16

19.  $(12 - \sqrt{2})^2$

a.  $146 - 24\sqrt{2}$

b. 142

c.  $142 - 24\sqrt{2}$

d.  $124\sqrt{2}$

For problems 20 – 21, rationalize each denominator and, if possible, simplify.

20.  $\sqrt{\frac{24}{7}}$

a.  $\frac{2\sqrt{42}}{7}$

b.  $2\sqrt{6}$

c.  $\frac{4\sqrt{21}}{7}$

d.  $\frac{4\sqrt{6}}{7}$

21.  $\frac{6}{4-\sqrt{3}}$

a.  $\frac{24-6\sqrt{3}}{13}$

b.  $\frac{24+6\sqrt{3}}{7}$

c.  $\frac{24-6\sqrt{3}}{7}$

d.  $\frac{24+6\sqrt{3}}{13}$

For problems 22 – 24, solve each radical equation. If the equation has no solution, so state.

22.  $\sqrt{3x-1} = -2$

a.  $\left\{\frac{5}{3}\right\}$

b.  $\{1\}$

c.  $\left\{\frac{3}{5}\right\}$

d. No solution

23.  $\sqrt{x+4} + 5 = 8$

a.  $\{164\}$

b.  $\{35\}$

c.  $\{5\}$

d. No solution

24.  $\sqrt{8x+9} = x$

a.  $\{9\}$

b.  $\{-1\}$

c.  $\{-1, 6\}$

d. No solution

25. The approximate time  $t$ , in seconds, that it takes an object to fall  $d$  feet

under the influence of gravity is given by the mathematical model  $t = \sqrt{\frac{d}{16}}$ .

A rock dropped from a cliff hits the ground 6 seconds later. How high is the cliff?

a. 24 ft.

b. 36 ft.

c. 576 ft.

d. 144 ft.