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Chapter 9
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. $-\left(\sqrt[4]{16}\right)^5=-32$ b. $\frac{1}{\left(\sqrt[4]{16}\right)^5}=\frac{1}{32}$ c. $\frac{1}{\frac{5}{4}\left(\sqrt{16}\right)}=\frac{1}{5}$ d. Not a real number

6. $64^{-\frac{4}{3}}$

a. $\left(\sqrt[4]{64}\right)^3=22.63$ b. $\frac{1}{\left(\sqrt[3]{64}\right)^4}=\frac{1}{256}$ c. $\left(\sqrt[3]{64}\right)^4=256$ d. $\frac{4}{3}\left(\sqrt{64}\right)=\frac{32}{3}$

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. $5x^2\sqrt[3]{10x^2}$

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

a. $4\sqrt{10-2\sqrt{8}}$ b. $100-2\sqrt{3}\sqrt{5}$ c. $2\sqrt{10}$ d. $20-2\sqrt{15}$

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

a. $60\sqrt{3}$ b. $64-4\sqrt{3}$ c. $64+4\sqrt{3}$ d. $68\sqrt{3}$

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

a. 60 b. –4 c. 4 d. 16

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

a. $146-24\sqrt{2}$ b. 142 c. $142-24\sqrt{2}$ d. $124\sqrt{2}$

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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 and 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.