

Practice Problems for MTE 8 – Rational Exponents and Radicals

1. Rewrite the following using radical notation. Simplify, if possible. $(16)^{\frac{1}{2}}$
2. Rewrite the following using radical notation. Simplify, if possible. $(-125)^{\frac{1}{3}}$
3. Rewrite the following using radical notation. Simplify, if possible. $(9x + 2)^{\frac{2}{5}}$
4. Use the calculator to approximate the radical $\sqrt{38}$ to three decimal places.
5. Fill in the blanks. The square root of 73 is between the consecutive integers _____ and _____ since 73 is between _____ and _____.
6. Use the calculator to approximate the radical $\sqrt[3]{103}$ to three decimal places.
7. Use the properties of exponents to simplify each expression.

Write answers with positive exponents. $a^{\frac{7}{8}}$
 $a^{\frac{3}{8}}$

8. Use the properties of exponents to simplify each expression.

Write answers with positive exponents. $\left(x^{\frac{4}{3}}y^{\frac{3}{5}}\right)^{15}$

9. Simplify. Assume that all variables represent any real numbers (positive or negative).
 $7\sqrt{45}$
10. Simplify. Assume that all variables represent any real numbers (positive or negative).
 $\sqrt{16x^2}$
11. Simplify. Assume that all variables represent any real numbers (positive or negative).
 $\sqrt[5]{-m^{18}p^{20}}$
12. Simplify. Assume that all variables represent any real numbers (positive or negative).
 $\sqrt[3]{56x^5}$
13. Simplify. Assume that all variables represent any real numbers (positive or negative).
 $\sqrt{5} \cdot \sqrt{10}$
14. Simplify. Assume that all variables represent any real numbers (positive or negative).
 $\frac{\sqrt{66}}{\sqrt{3}}$
15. Simplify. Assume that all variables represent any real numbers (positive or negative).
 $-\sqrt{\frac{17}{64}}$
16. Which of the following are like radicals? Circle your answers.
 $\sqrt{72}$, $5\sqrt{2}$, $\sqrt{28}$, $\sqrt{50}$, $\sqrt{12}$

17. Perform the indicated operation. Simplify if possible. $4\sqrt{20} + \sqrt{49} - \sqrt{180}$

18. Perform the indicated operation. Simplify if possible. $\frac{\sqrt[3]{7x}}{12} - \sqrt[3]{\frac{7x}{27}}$

19. Perform the indicated operation. Simplify if possible. $\sqrt{3}(\sqrt{3} - \sqrt{6x})$

20. Perform the indicated operation. Simplify if possible. $(4 - \sqrt{7})(1 - 2\sqrt{7})$

21. Rationalize the denominator. $\frac{-14}{\sqrt{8x}}$

22. Rationalize the denominator. $\frac{10}{\sqrt[3]{2}}$

23. Rationalize the denominator. $\frac{1 + \sqrt{6}}{3 - \sqrt{6}}$

24. Solve. $4 + \sqrt[3]{x-7} = 0$

25. Solve. $\sqrt{3x-2} = x-4$

26. What is the mathematical symbol for $\sqrt{-1}$?

27. Which of the following represent imaginary numbers?

$$\sqrt{-9}, \quad 7i, \quad -\sqrt{5}, \quad (-3)^{\frac{1}{2}}, \quad 4^{-\frac{1}{2}}, \quad \sqrt[3]{-64}, \quad i\sqrt{2}$$

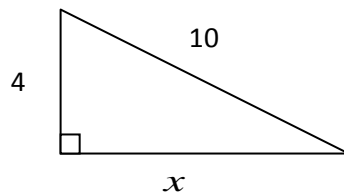
28. Simplify each of the following using the imaginary unit.

$$\sqrt{-72}, \quad 5\sqrt{-2}, \quad \sqrt{-288}, \quad \sqrt{-50}, \quad \sqrt{-12}$$

29. Simplify using the imaginary unit. $\frac{-6 \pm \sqrt{-32}}{2}$

30. A wire is needed to support a vertical pole 18 feet high. The cable is to be anchored 8 feet from the base of the pole. How much cable is needed? Approximate the answer to three decimal places.

31. Find the missing side. Give the exact answer as a simplified radical.



32. Find the distance between the points (9, 4) and (-9, 10). Give the exact answer as a simplified radical.