

PC11 Radicals Practice (DO NOT WRITE ON THIS PAPER)

Radicals is a math topic that has a connection with exponents. A fractional exponent can be rewritten as a radical. This year in Pre-Calculus 11 we will focus on simplifying radicals and working with radical equations. Next year you will learn more about graphing and transforming radical functions. Visit hunkim.com/11 for more BC Pre-Calculus 11 resources.

- Simplifying radicals
- Ordering a set of irrational numbers
- Performing operations with radicals
- Solving simple (one radical only) equations algebraically and graphically
- Identifying domain restrictions and extraneous roots of radical equations

1. Evaluate $\sqrt{25}$
2. Solve $x^2 = 25$
3. Write as a mixed radical:
 - a. $\sqrt{8}$
 - b. $\sqrt{1575}$
4. Write as an entire radical
 - a. $2\sqrt{3}$
 - b. $3\sqrt[3]{2}$
 - c. $-2\sqrt[3]{3}$
5. If possible, evaluate
 - a. $\sqrt{-9}$
 - b. $\sqrt[3]{-8}$
 - c. $\sqrt{4\,000\,000}$
 - d. $\sqrt{0.25}$
 - e. $\sqrt{\frac{4}{9}}$
6. Order from least to greatest: $\sqrt{9}, 2\sqrt{3}, \sqrt{30}, \pi$
7. $f(x) = \sqrt{x}$
 - a. Sketch and label 3 points
 - b. Evaluate $f(25)$
8. $y = \sqrt{x-2} - 3$
 - a. Sketch
 - b. Domain?
 - c. Range?
9. $y = \sqrt{x-a} + b$. Given $a, b > 0$, describe the transformation.
10. $y = -2\sqrt{x+1}$
 - a. Sketch and describe the transformation
 - b. Domain?
 - c. Range?
11. $y = a\sqrt{x+b} + c$
Given $a, b, c > 0$ describe the transformation.
12. Find the domain of:
 - a. $\sqrt{3-5x}$
 - b. $\frac{\sqrt{1-2x}}{x}$
 - c. $\frac{\sqrt{3x-2}}{x^2-9}$
 - d. $\frac{2\sqrt{x}}{x^2+x-20}$
 - e. $\frac{\sqrt{2+5x}}{3x^2+13x-10}$
13. Rationalize:
 - a. $\frac{1}{\sqrt{2}}$
 - b. $\frac{4}{\sqrt{8}}$
 - c. $\frac{9}{6-\sqrt{3}}$
 - d. $\frac{5}{5+\sqrt{5}}$
 - e. $\frac{1}{\sqrt[3]{3}}$
14. Simplify $\sqrt{8} + 3\sqrt{2}$
15. Simplify $\sqrt{8} - \sqrt[3]{32} + 3\sqrt{2} + \sqrt[3]{4}$
16. Simplify $\frac{\sqrt{12}}{2}$
17. Simplify $\frac{-2+\sqrt{12}}{-2}$
18. $2\sqrt{3} \times 3\sqrt{2}$

19. $(5\sqrt{5})(2\sqrt{5})$

20. $\sqrt{2} \cdot \sqrt{3} \cdot \sqrt{5}$

21. $a^b \cdot \sqrt{d} \cdot a^c \cdot \sqrt{e}$

22. Expand and simplify:

a. $2\sqrt{2}(\sqrt{4} - 3\sqrt{2} + 1)$

b. $(2 - \sqrt{2})^2$

c. $(\sqrt{3} - \sqrt{2})(\sqrt{3} + \sqrt{2})$

d. $3(\sqrt{8} - \sqrt{2})(1 - \sqrt{8})$

e. $(\sqrt{8} - 1)^3$

f. $(\sqrt{2} - \sqrt{3})(2 + \sqrt{6} + 3)$

23. A rectangle has a base of $4\sqrt{2} - 2\sqrt{3}$

and a height of $\sqrt{8} - \sqrt{3}$

a. Area in simplified form?

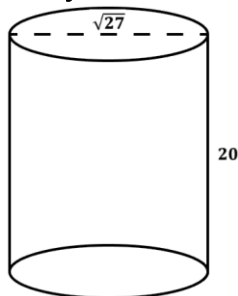
b. Perimeter in simplified form?

24. A cylinder has a diameter of $\sqrt{8}$ and a height of 10

a. Volume?

b. Area including the bottom?

25. See cylinder below:



a. Volume?

b. Area including the bottom?

26. Solve:

a. $\sqrt{x} = 3$

b. $2\sqrt{x} = 4$

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

27. $\sqrt{x + 4} = 2 - x$

a. Estimate the solution graphically

b. Find the point of intersection algebraically

c. Check for extraneous roots

d. Find the point of intersection

28. Solve $\sqrt{x - 1} = 2 - \frac{x}{2}$

29. Solve $\sqrt{3x - 2} - 1 = 6 - \frac{x}{2}$

Challenge:

30. Enrichment: Solve $\sqrt{x + 1} - 2 = \sqrt{x - 3}$

31. Enrichment:

a. Define: $|a|$

b. Simplify $\sqrt{x^2}$

c. Simplify $\sqrt{x^4}$

d. Simplify $\sqrt{x^6}$

e. Simplify $\sqrt{a^2 b^8 c^{14}}$