

Simplify each expression completely. **SHOW ALL WORK**

1. $32^{\frac{1}{5}}$

2. $15^{\frac{1}{3}} \cdot 15^{\frac{1}{3}} \cdot 15^{\frac{1}{3}}$

3. $20^{\frac{1}{3}} \cdot 50^{\frac{1}{3}}$

1. _____

2. _____

3. _____

Write each expression in radical form.

4. $x^{2.5}$

5. $(3y)^{\frac{2}{5}}$

4. _____

5. _____

Write each expression in exponential form.

6. $\sqrt[8]{y^3}$

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

6. _____

7. _____

Simplify. Assume that all variables are positive. **SHOW ALL WORK**
(Only use your calculator to check your answer.)

8. $(50^{\frac{1}{8}})^8$

9. $x^{\frac{1}{5}} \cdot x^{\frac{1}{3}}$

10. $(2a^{\frac{1}{4}}b^{\frac{1}{3}})^3$

8. _____

9. _____

10. _____

11. $(x^{\frac{3}{4}})^{-12}$

12. $(\frac{x^2}{y^{\frac{1}{4}}})^{16}$

13. $(5y^{\frac{1}{4}})(-6y^{\frac{2}{3}})$

11. _____

12. _____

13. _____

Solve each radical equation. Check for extraneous solutions. SHOW WORK.

14. $3\sqrt{x} + 1 = 13$

15. $\sqrt[3]{5x + 2} = 3$

16. $(2x + 2)^{\frac{1}{4}} = 2$

14. _____

15. _____

16. _____

17. $\sqrt{5x - 1} + 3 = x$

18. $2\sqrt[3]{5x + 4} + 3 = 11$

19. $\sqrt{x - 2} - \sqrt{28 - 2x} = 0$

17. _____

18. _____

19. _____

Use your calculator for this one. Extra credit if you show all work!!!!

20. $\sqrt{2x + 1} - \sqrt{x} = 1$

20. _____

Simplify each expression completely. **SHOW ALL WORK**

1. $32^{\frac{1}{5}}$ $\sqrt[5]{32}$

2. $15^{\frac{1}{3}} \cdot 15^{\frac{1}{3}} \cdot 15^{\frac{1}{3}}$
 $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} = 1$

3. $20^{\frac{1}{3}} \cdot 50^{\frac{1}{3}}$
 $\sqrt[3]{20} \sqrt[3]{50}$

1. 2

2. 15

3. 10

Write each expression in radical form.

4. $x^{2.5}$ $\sqrt[10]{x^5} = \frac{x^5}{10} = \frac{5}{2}$

5. $(3y)^{\frac{2}{5}}$

4. $\sqrt{x^5} = x^2 \sqrt{x}$

5. $\sqrt[5]{(3y)^2} = \sqrt[5]{9y^2}$

Write each expression in exponential form.

6. $\sqrt[8]{y^3}$

7. $\sqrt{x^2 y^3}$

6. $y^{\frac{3}{8}}$

7. $x^{\frac{2}{5}} y^{\frac{3}{5}}$

Simplify. Assume that all variables are positive. **SHOW ALL WORK**
(Only use your calculator to check your answer.)

8. $(50^{\frac{1}{8}})^8$

9. $x^{\frac{1}{5}} \cdot x^{\frac{1}{3}}$
 $\frac{1}{5} + \frac{1}{3}$
 $\frac{3}{15} + \frac{5}{15} = \frac{8}{15}$

10. $(2a^{\frac{1}{3}} b^{\frac{1}{3}})^3$
 $2^3 a^{\frac{3}{4}} b$

8. 50

9. $x^{\frac{8}{15}}$

10. $8a^{\frac{3}{4}} b$

11. $(x^{\frac{3}{4}})^{-12}$
 $\frac{3}{4} \cdot -12 = -9$

12. $(\frac{x^2}{y^4})^{\frac{1}{2}}$
 $\frac{1}{2} \cdot 16^8 = 8$
 $\frac{1}{4} \cdot 16^4 = 4$

13. $(5y^{\frac{1}{4}})(-6y^{\frac{2}{3}})$
 $\frac{1}{4} + \frac{2}{3}$
 $\frac{3}{12} + \frac{8}{12} = \frac{11}{12}$

11. $x^{-9} = \frac{1}{x^9}$

12. $\frac{x^8}{y^4}$

13. $-30y^{\frac{11}{12}}$

Solve each radical equation. Check for extraneous solutions. SHOW WORK.

14. $3\sqrt{x} + 1 = 13$

$$\begin{aligned} 3\sqrt{x} &= 12 \\ \sqrt{x} &= 4 \\ x &= 16 \end{aligned}$$

15. $\sqrt[3]{5x+2} = 3$

$$\begin{aligned} 5x+2 &= 27 \\ 5x &= 25 \\ x &= 5 \end{aligned}$$

16. $(2x+2)^{\frac{1}{4}} = 2$

$$\begin{aligned} 4\sqrt[4]{2x+2} &= 2 \\ 2x+2 &= 16 \\ 2x &= 14 \\ x &= 7 \end{aligned}$$

14. $x=16$ 3

15. $x=5$ 3

16. $x=7$ 3

17. $\sqrt{5x-1} + 3 = x$

$$\begin{aligned} \sqrt{5x-1} &= x-3 \\ 5x-1 &= (x-3)^2 \\ 5x-1 &= x^2-6x+9 \\ x^2-11x+10 &= 0 \\ (x-1)(x-10) &= 0 \\ x &= 1, x=10 \\ \text{extraneous} \end{aligned}$$

18. $2\sqrt[3]{5x+4} + 3 = 11$

$$\begin{aligned} 2\sqrt[3]{5x+4} &= 8 \\ \sqrt[3]{5x+4} &= 4 \\ 5x+4 &= 64 \\ 5x &= 60 \\ x &= 12 \end{aligned}$$

19. $\sqrt{x-2} - \sqrt{28-2x} = 0$

$$\begin{aligned} \sqrt{x-2} &= \sqrt{28-2x} \\ x-2 &= 28-2x \\ 3x &= 30 \\ x &= 10 \end{aligned}$$

17. $x=10$ 3

18. $x=12$ 3

19. $x=10$ 3

Use your calculator for this one. Extra credit if you show all work!!!!

20. $\sqrt{2x+1} - \sqrt{x} = 1$

$$\begin{aligned} \sqrt{2x+1} &= 1 + \sqrt{x} \\ 2x+1 &= (1+\sqrt{x})^2 \\ 2x+1 &= 1+2\sqrt{x}+x \\ x &= 2\sqrt{x} \\ x^2 &= 4x \\ x^2-4x &= 0 \end{aligned}$$

$$\begin{aligned} x(x-4) &= 0 \\ x &= 0, x=4 \end{aligned}$$

20. $x=0, 4$ 3