

Show your work and circle your answers! ALL PROBLEMS CAN BE CALCULATED WITHOUT A CALCULATOR.

Convert: Write each expression in exponential form.

1. $(\sqrt{5})^3 = 5^{\frac{3}{2}}$

2. $(\sqrt[3]{10})^5 = 10^{\frac{5}{3}}$

3. $\sqrt[3]{(6)^2} = 6^{\frac{2}{3}}$

4. $\sqrt[3]{6v^2} = (6v^2)^{\frac{1}{3}}$

5. $\sqrt{7b} = (7b)^{\frac{1}{2}}$

6. $\sqrt[3]{7x} = (7x)^{\frac{1}{3}}$

Convert: Write each expression in radical form.

7. $3^{2/5} = (\sqrt[5]{3})^2$

8. $5^{4/3} = (\sqrt[3]{5})^4$

9. $10^{1/4} = \sqrt[4]{10}$

10. $6^{5/2} = (\sqrt{6})^5$

11. $7^{1/3} = \sqrt[3]{7}$

12. $(3m)^{7/5} = (\sqrt[5]{3m})^7$

Simplify each radical expression. Leave your answers in radical form:

13. $\sqrt{m^2} \sqrt{m^4} = \sqrt{m^6} = m^3$

14. $\sqrt{16a} \sqrt{12a^2} = \sqrt{192a^3} = 8a \sqrt{3a}$

15. $\sqrt{12g^9} \sqrt{4g} = \sqrt{48g^{10}} = 4g^5 \sqrt{3}$

16. $-\sqrt{a^3 b^5 c^3} = -abc \sqrt{abc}$

17. $\sqrt{4y^4} = 2y^2$

18. $\frac{\sqrt{x^2}}{\sqrt{y^4}} = \frac{x}{y^2}$

19. $\sqrt{121x^{12}y^4} = 11x^6y^2$

20. $\frac{\sqrt{18x^5}}{\sqrt{81}} = \frac{3x^2 \sqrt{2x}}{9} = \frac{x^2 \sqrt{2x}}{3}$

21. $\frac{\sqrt{48m^3n^4}}{\sqrt{6m^2n}} = \frac{4mn^2 \sqrt{3m}}{m \sqrt{6n}}$
 SKIP

Simplify:

22. $81^{1/2} = \sqrt{81} = 9$

23. $1000^{5/3} = 100,000$

24. $81^{5/4} = 243$

25. $216^{2/3}$

36

Simplify:

28. $(216x^3)^{5/3}$

$(\sqrt[3]{216x^3})^5$
 $7776x^5$

31. $(x^5)^{-2/5}$

$\frac{1}{x^2}$

26. $64^{4/3}$

256

29. $(625k^{12})^{1/4}$

$\sqrt[4]{625k^{12}}$
 $5k^3$

32. $(x^9)^{-4/3}$

$\frac{1}{x^{12}}$ SKIP

27. $(8a^3)^{1/3}$

$\sqrt[3]{8a^3}$
 $2a$

30. $(p^4)^{1/2}$

$\sqrt{p^4} = p^2$

33. $(100000r^5)^{6/5}$

1,000,000 r^6
 SKIP

Convert to exponential form and then simplify:

34. $\sqrt{x} \cdot \sqrt[3]{x}$

$= x^{1/2} \cdot x^{1/3} = x^{5/6}$
 or $\sqrt[6]{x^5}$

35. $\sqrt[3]{y}$

$= (y^{1/3})^{1/2} = y^{1/6}$

36. $\sqrt[4]{\sqrt[5]{\sqrt[6]{z}}}$

$= (z^{1/6})^{1/5})^{1/4} = z^{1/120}$

37. $\sqrt[5]{(\sqrt[3]{x})^{1/4}}$

SKIP

38. $x^{3/4} \cdot \sqrt[4]{x}$

SKIP

39. $(\sqrt{m^{1/2}}) \cdot \sqrt[3]{m^{3/4}}$

SKIP

Solve each equation.

40. $x^{1/2} = 4$

$\sqrt{x} = 4$
 $x = 16$

41. $(c-1)^{1/3} = 2$

$(\sqrt[3]{c-1})^3 = (2)^3$
 $c-1 = 8$ $c = 9$

42. $m^{3/4} = 27$

$(\sqrt[4]{m^3})^4 = (27)^4$
 $= 81$ SKIP

43. $y^{5/2} - 32 = 0$

$+32$ $+32$
 $(\sqrt{y^5})^2 = (32)^2$
 $y^5 = 1024 = 4$

44. $-1 = -8 + \sqrt{\frac{n}{8}}$

$+8$ $+8$
 $(7)^2 (\frac{n}{8})^2 = 49$ $n = 392$
 $49 = \frac{n}{8}$

45. $\sqrt{n-4} - 8 = -3$

$+8$ $+8$
 $(\sqrt{n-4})^2 = (5)^2$
 $n-4 = 25$

46. $(\sqrt{x+4})^2 = (\sqrt{3x-4})^2$

$x+4 = 3x-4$

$x = 4$

47. $(\sqrt{n+3})^2 = (8)^2$

$n+3 = 64$

-3 -3
 $n = 61$

48. $(\sqrt{\frac{b}{10}})^2 = (\sqrt{44-b})^2$

$10 (\frac{b}{10}) = (44-b)$

$b = 440 - 10b$
 $+10b$ $+10b$

$11b = 440$
 $b = 40$