

PC11 Rational Exponents Assignment Solutions

1. $(-3)^4$
 81

2. -3^4
 -81

3. $0^1 \div 1^0$
 $\frac{0}{1} = 0$

4. $0^0 + 0$
Undefined

5. $-3(-3)^{-2}$
 $-3 \times \frac{1}{9} = -\frac{1}{3}$

6. $(-1)^{2024}$
 1

7. 3^{-2}
 $\frac{1}{9}$

8. $\left(\frac{2}{3}\right)^{-3}$
 $\left(\frac{3}{2}\right)^3 = \frac{27}{8}$

9. $\frac{x(x^3)^4(x^2)}{x^{-3}}$
 $\frac{x^{15}}{x^{-3}} = x^{18}$

10. $\left(\frac{4a^3b^5}{6ab^{-1}}\right)^{-2}$
 $\left(\frac{6ab^{-1}}{4a^3b^5}\right)^2 = \left(\frac{3}{2a^2b^6}\right)^2 = \frac{9}{4a^4b^{12}}$

11. Simplify $\frac{\sqrt{27}}{3}$
 $\sqrt{3}$

12. Rationalize $8^{-\frac{1}{2}}$
 $\frac{1}{2\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{4}$

13. Write $x^{\frac{11}{2}}$ as a mixed radical
 $\sqrt{x^{11}} = \sqrt{x^5 \cdot x^5 \cdot x} = x^5\sqrt{x}$

14. $(0.0004)^{1/2}$
 0.02

15. $\sqrt[5]{\sqrt{x}} = x^k$. Find k
 $\left(x^{\frac{1}{2}}\right)^{\frac{1}{5}} = x^k$
 $\frac{1}{10}$

16. Solve $2a^2 = 50$
 $a^2 = 25$
 $a = \pm 5$

17. Solve $x^6 = 64$
 $x = \pm 2$

18. $64^{-\frac{2}{3}}$
 $(4^3)^{-\frac{2}{3}} = 4^{-2} = \frac{1}{16}$

19. Show that $1^{-1.2} = 1$
 $\frac{1}{16^{6/5}} = \frac{1}{\sqrt[5]{16^6}} = \frac{1}{1} = 1$

20. Convert $\sqrt[3]{5400}$ to a mixed radical
 $\sqrt[3]{2 \times 3 \times 3 \times 3 \times 2 \times 2 \times 5 \times 5}$
 $6\sqrt[3]{25}$

21. Simplify $x(\sqrt[5]{x^2})(\sqrt{x^3})$ using fractional exponents in the form $x^{a/b}$
 $x^1 \cdot x^{\frac{2}{5}} \cdot x^{\frac{3}{2}}$
 $x^{\frac{29}{10}}$

22. Simplify $\frac{35^{600}}{5^{600}}$
 $\left(\frac{35}{5}\right)^{600} = 7^{600}$

23. Solve $49^{1-3x} = 343^{2x+5}$
 $(7^2)^{1-3x} = (7^3)^{2x+5}$
 $2 - 6x = 6x + 9$
 $-7 = 12x$
 $x = -\frac{7}{12}$

24. Solve $x^{3/7} = 3$
 $x = 3^{\frac{7}{3}}$

25. Solve $x^{2/5} = 5$

Let $a = x^{1/5}$

$$\left(x^{1/5}\right)^2 = 5$$

$$a^2 = 5$$

$$a = \pm\sqrt{5}$$

$$x = \pm 5^{5/2}$$

26. Solve $\left(\frac{3^{1-3x}}{3^{2x+2}}\right)^3 = 27$

$$\left(3^{1-3x-(2x+2)}\right)^3 = 3^3$$

Cube root both sides

$$\left(3^{1-3x-(2x+2)}\right) = 3^1$$

$$-5x - 3 = 1$$

$$-4 = 5x$$

$$x = -\frac{4}{5}$$

27. Evaluate $\frac{-3^{3000}}{(-3)^{2998}}$

$$-\frac{3^{3000}}{3^{2998}} = -3^2 = -9$$

28. Show that $\sqrt[c]{a^b} = (\sqrt[c]{a})^b$

$$LS = \sqrt[c]{a^b} = a^{b/c}$$

$$RS = (\sqrt[c]{a})^b = \left(a^{1/c}\right)^b = a^{b/c}$$

$$LS = RS$$