

Simplify. Write all final answers with positive exponents.

1. $\sqrt{6} \div \sqrt{2}$

$$\sqrt{\frac{6}{2}} = \boxed{\sqrt{3}}$$

2. $\sqrt{8} \div \sqrt[4]{32}$

$$\frac{\sqrt{2^3}}{\sqrt[4]{2^5}} = \frac{2^{3/2}}{2^{5/4}} = \boxed{2^{1/4}}$$

3. $\sqrt[3]{128} \cdot \sqrt{32}$

$$\sqrt[3]{2^7} \cdot \sqrt{2^5} = 2^{7/3} \cdot 2^{5/2} = \boxed{2^{29/6}}$$

4. $\sqrt[3]{2^{3.1} \div 2^{0.7}}$

$$\sqrt[3]{\frac{2^{3.1}}{2^{0.7}}} = \sqrt[3]{2^{2.4}} = 2^{2.4/3} = \boxed{2^{0.8}}$$

5. $\sqrt[5]{10^{4.4} \times 10^{-6.3} \div 10^{-8.1}}$

$$\sqrt[5]{\frac{10^{4.4} \times 10^{-6.3}}{10^{-8.1}}} = \sqrt[5]{\frac{10^{-1.9}}{10^{-8.1}}} = \sqrt[5]{10^{6.2}} = 10^{6.2/5} = \boxed{10^{1.24}}$$

6. $\sqrt[4]{\sqrt[3]{16}}$

$$(2^4)^{1/3})^{1/4} = \boxed{2^{1/3}}$$

7. $\sqrt[3]{36}$

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

8. $64^x = 4$

$$(4^3)^x = 4^1$$

$$3x = 1$$

$$\boxed{x = 1/3}$$

9. $49^x = 343$

$$(7^2)^x = 7^3$$

$$2x = 3$$

$$\boxed{x = 3/2}$$

10. $2^x = 1024$

$$2^x = 2^{10}$$

$$\boxed{x = 10}$$

11. $625^x = 1$

$$\boxed{x = 0}$$