Class 1 | Chapter 1.08 | | Powers with rational exponents | Answers

Task 1. Calculate:

(a) $324^{0.5} = 18$

(b) $0.0625^{0.25} = \frac{1}{2}$

(c) $1000^{1\frac{1}{3}} = 10000$

(d) $(0.01)^{-\frac{3}{2}} = 1000$

(e) $1024^{0.3} = 8$

(f) $64^{-\frac{2}{3}} = \frac{1}{16}$

(g) $\left(\frac{9}{4}\right)^{\frac{-1}{2}} = \frac{2}{3}$

(h) $\left(\frac{8}{27}\right)^{-\frac{1}{3}} = \frac{3}{2}$

Task 2. Calculate.

(a) $\left(5^{\frac{1}{3}} \times 5^{-\frac{1}{2}} \div 5^{\frac{5}{6}}\right)^{-1} = 5$

(b) $\left(6^{-0.9} \div 6^{-\frac{4}{5}} \times 6^{1.7}\right)^{\frac{5}{8}} = 6$

(c) $\left(5^{\frac{1}{3}} \times 25^{-\frac{1}{2}} \div 0.2^{\frac{5}{6}}\right)^{-6} = \frac{1}{5}$

(d) $\left(0.25^{-0.9} \div 2^{-\frac{4}{5}} \times 8^{1.1} \times 2^{0.1}\right)^{0.5} = 8$

(e) $\left[5^{\frac{1}{4}} \times (0.2)^{-\frac{3}{4}}\right]^{-3} = \frac{1}{125}$

(f) $\left\{\left(11^{\frac{1}{3}}\right)^2 \div 11^{-\frac{1}{3}} \times \frac{1}{11}\right\}^{20} \div 100^{0.5} = \frac{1}{10}$

Task 3. Convert each of the following expressions to a power with integer base and rational exponent:

(a) $\sqrt{125\sqrt{25\sqrt{5}}} = 5^{2\frac{1}{8}}$

(b) $\sqrt{8\sqrt{4 \times \sqrt[3]{2}}} = 2^{2\frac{1}{12}}$

(c) $\sqrt[3]{\sqrt[5]{\sqrt[4]{7}}} = 7^{\frac{1}{60}}$

(d) $\sqrt{7^3} \times \sqrt{\sqrt[3]{7}} = 7^{1\frac{2}{3}}$

(e) $3\sqrt{3} \times \sqrt[3]{3} \times \sqrt[4]{3} = 3^{2\frac{1}{12}}$

(f) $\sqrt[5]{2^{11}} \div 2^3 \times \sqrt{2} = 2^{-\frac{3}{10}}$

Task 4. Compare the two given numbers without using a calculator.

(a) $\sqrt{5+\sqrt{10}}$ and $\sqrt{8}$

(b) $\sqrt[3]{\sqrt{10}}$ and $0.1^{-0.5} \div 10^{\frac{1}{3}}$

Solution 4(a) : $\sqrt{5+\sqrt{10}} > \sqrt{5+\sqrt{9}} = \sqrt{8}$ **Answer 4(a)**: $\sqrt{5+\sqrt{10}} > \sqrt{8}$

Solution 4(b): $\sqrt[3]{\sqrt{10}} = \left(10^{\frac{1}{2}}\right)^{\frac{1}{3}} = 10^{\frac{1}{6}}$

$$0.1^{-0.5} \div 10^{\frac{1}{3}} = 10^{0.5} \div 10^{\frac{1}{3}} = 10^{0.5-\frac{1}{3}} = 10^{\frac{1}{2}-\frac{1}{3}} = 10^{\frac{1}{6}}$$

Answer 4(b): $\sqrt[3]{\sqrt{10}} = 0.1^{-0.5} \div 10^{\frac{1}{3}}$