

$$\textcircled{10} \quad \sqrt{11} \cdot \sqrt{22} = \textcircled{11\sqrt{2}}$$
$$\downarrow$$
$$\sqrt{11} \cdot \sqrt{2}$$

$$\sqrt{10} \cdot \sqrt{20} = \textcircled{10\sqrt{2}}$$
$$\downarrow$$
$$\sqrt{10} \cdot \sqrt{2}$$

$$\textcircled{11} \quad \sqrt[3]{162} = \textcircled{3\sqrt[3]{6}}$$
$$\downarrow$$
$$\sqrt[3]{54} \cdot \sqrt[3]{3}$$
$$\downarrow$$
$$\sqrt[3]{18} \cdot \sqrt[3]{3}$$
$$\downarrow$$
$$\sqrt[3]{6} \cdot \sqrt[3]{3}$$

12.  $\sqrt[3]{80} = 2\sqrt[3]{10}$

$\begin{array}{l} \cancel{4} \quad \cancel{20} \\ \uparrow \quad \uparrow \\ (2)(2) \quad (4)(5) \\ (2)(2) \end{array}$

13.  $\sqrt{x^{13}} \rightarrow x^{13/2} = x^6 \sqrt{x}$

$x^{6\frac{1}{2}}$

14.  $\sqrt{a^5 b^8 c^{11}} \rightarrow a^2 b^4 c^5 \sqrt{ac}$

15.  $\sqrt{x^{27} y^{50} z^{103}}$

$\rightarrow x^{13} y^{25} z^{51} \sqrt{xz}$

16.  $\sqrt{40x^4y^8} = 2x^2y^4\sqrt{10}$

$\begin{array}{c} \swarrow \\ \textcircled{2} \quad \cancel{20} \\ \swarrow \quad \nearrow \\ \textcircled{2} \quad \cancel{4} \\ \swarrow \quad \nearrow \\ \underline{2} \quad \underline{5} \end{array}$

17.  $\sqrt{75ab^3c^7} = 5bc^3\sqrt{3abc}$

$\begin{array}{c} \swarrow \\ \cancel{5} \quad \underline{3} \\ \swarrow \quad \nearrow \\ \textcircled{5} \quad \textcircled{5} \end{array}$

18. 
$$\sqrt[3]{\frac{150x^2y^3z^{12}}{8x^5}} = \frac{yz^4\sqrt[3]{150x^2}}{2x^2\sqrt[3]{x}}$$

$$\sqrt[3]{150x^2y^3z^{12}}$$

$$\begin{array}{c} \wedge \quad \wedge \\ \cancel{15} \quad \cancel{10} \\ \wedge \quad \wedge \\ 35 \quad 25 \end{array}$$

$$\sqrt[3]{8x^5}$$

$$\begin{array}{c} \wedge \\ \textcircled{2} \quad 4 \\ \wedge \\ \textcircled{2} \quad \textcircled{2} \end{array}$$

19.  $\sqrt[3]{320x^{14}y^{17}z^{20}}$  =  $\left[4x^4y^5z^6\sqrt[3]{5x^2y^2z^2}\right]$

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graph TD
    320 --> 20
    320 --> 16
    20 --> 2
    20 --> 10
    16 --> 2
    16 --> 8
    10 --> 2
    10 --> 5
    8 --> 4
    8 --> 2
    4 --> 2
    4 --> 2
  
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