

10.3 p. 619 (626)

$$\text{ex 2 } \sqrt{5} \cdot \sqrt{5} = \sqrt{25} = 5$$

$$\downarrow$$

$$(\sqrt{5})^2 = 5$$

$$\text{ex 4 } \sqrt{12} \cdot \sqrt{3} = \sqrt{36} = 6$$

$$\text{ex 6 } \sqrt{10} \cdot \sqrt{3} = \sqrt{30}$$

$$\text{ex 8 } \sqrt{23} \cdot \sqrt{t} = \sqrt{23t}$$

$$\text{ex 12 } \sqrt[3]{3} \cdot \sqrt[3]{6} = \sqrt[3]{18}$$

$$\text{ex 14 } \sqrt[3]{9x} \cdot \sqrt[3]{4y} = \sqrt[3]{36xy}$$

$$\text{ex 20 } \sqrt{5} \cdot \sqrt{12} \quad \text{can't simplify with the product rule.}$$

$$\text{ex 22 } \sqrt{\frac{16}{49}} = \frac{\sqrt{16}}{\sqrt{49}} = \frac{4}{7}$$

$$\text{ex 24} \quad \sqrt{\frac{13}{49}} = \frac{\sqrt{13}}{\sqrt{49}} = \frac{\sqrt{13}}{7}$$

$$\text{ex 26} \quad \sqrt{\frac{k}{100}} = \frac{\sqrt{k}}{10}$$

$$\text{ex 28} \quad \sqrt{\frac{w^{10}}{36}} = \frac{w^5}{6}$$

$$\sqrt{w^{10}} = w^{\frac{10}{2}} = w^5$$

$$\begin{array}{l} x^2 = x \cdot x \\ x^4 = x^2 \cdot x^2 \\ 2^{18} = 2^9 \cdot 2^9 \\ w^5 \cdot w^5 = \\ w^{10} \end{array}$$

$$\text{ex 30} \quad \sqrt[3]{\frac{-216}{125}} = -\frac{6}{5}$$

$$\begin{array}{l} 6 \cdot 6 \cdot 6 = 216 \\ 5 \cdot 5 \cdot 5 = 125 \end{array}$$

$$\text{ex 32} \quad \sqrt[3]{\frac{t}{125}} = \frac{\sqrt[3]{t}}{5}$$

$$\text{ex 34} \quad \sqrt[4]{\frac{625}{y^4}} = -\frac{5}{y}$$

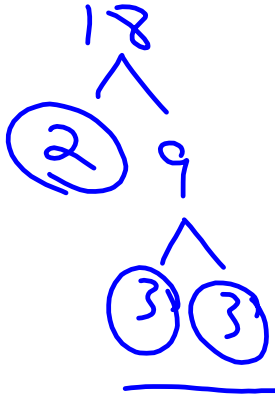
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$$y^{\frac{4}{4}}$$

ex 36  $\sqrt[5]{\frac{32}{y^{20}}} = \frac{2}{y^4}$

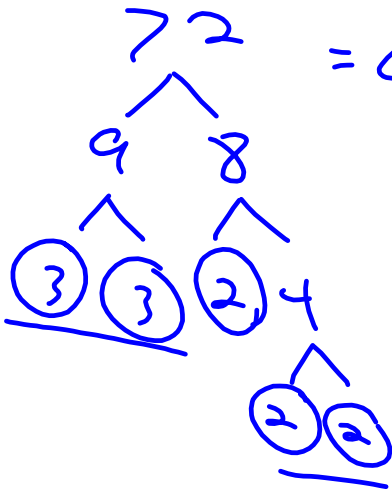
simplified form  
simplest radical form

ex 38  $\sqrt{18} = 3\sqrt{2}$



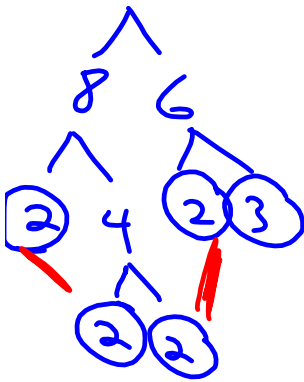
$$\begin{aligned} \sqrt{18} &= \\ \sqrt{9} \sqrt{2} &= \\ 3\sqrt{2} & \end{aligned}$$

ex 40  $\sqrt{72}$   
 $= 3 \cdot 2 \sqrt{2}$   
 $= 6\sqrt{2}$



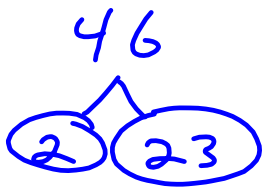
$$\begin{aligned} \sqrt{72} &= \sqrt{9} \sqrt{8} & \sqrt{72} \\ &= 3\sqrt{8} & = \sqrt{36} \sqrt{2} \\ &= 3 \cdot \sqrt{4} \sqrt{2} & = 6\sqrt{2} \\ &= 3 \cdot 2 \cdot \sqrt{2} \\ &= 6\sqrt{2} \end{aligned}$$

$$\begin{aligned} \text{ex 42 } -\sqrt{48} \\ &= -2 \cdot 2 \cdot \sqrt{3} \\ &= -4\sqrt{3} \end{aligned}$$

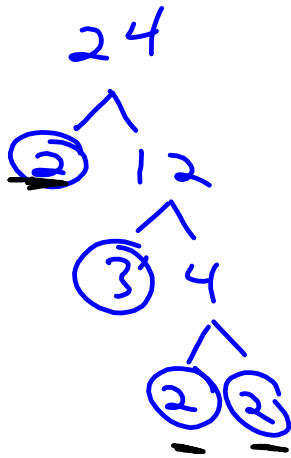


$$\begin{aligned} &-\sqrt{48} && -2\sqrt{12} \\ &-\sqrt{16}\sqrt{3} \\ &-\ 4\sqrt{3} \end{aligned}$$

ex 46  $\sqrt{46}$  simplified already.

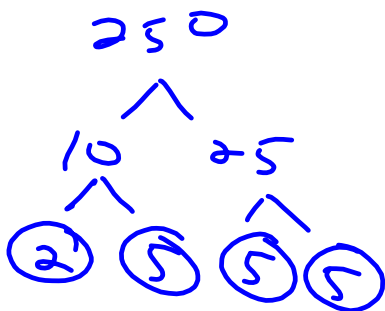


$$\text{ex 48 } \sqrt[3]{24} = 2\sqrt[3]{3}$$

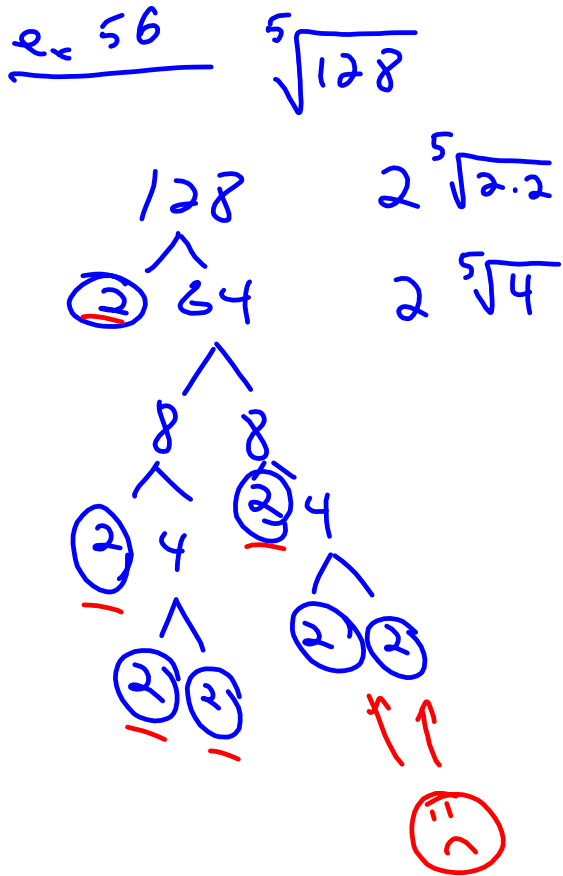


$$\begin{aligned} \sqrt[3]{24} &= \sqrt[3]{8} \sqrt[3]{3} \\ &= 2\sqrt[3]{3} \end{aligned}$$

$$\text{ex 50 } \sqrt[3]{-250} = -5\sqrt[3]{2}$$

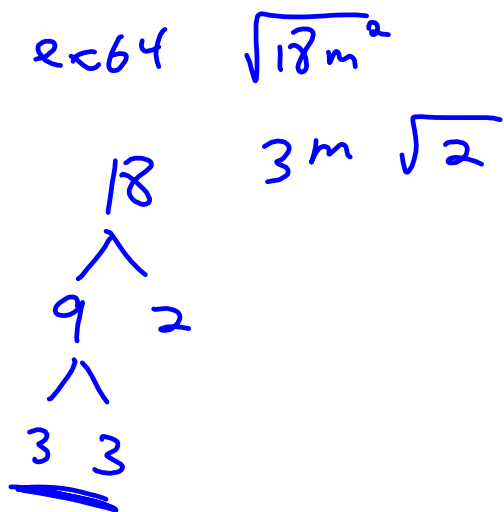


$$\begin{aligned} \sqrt[3]{-250} &= -\sqrt[3]{125} \sqrt[3]{2} \\ &= -5\sqrt[3]{2} \end{aligned}$$



$$\sqrt[5]{128} = \sqrt[5]{32} \cdot \sqrt[5]{4}$$

$$= 2 \sqrt[5]{4}$$



$$\sqrt{18m^2} = \sqrt{9m^2} \sqrt{2}$$

$$= 3m \sqrt{2}$$

what if ...

$$\sqrt{18m^3} = \sqrt{9m^2} \sqrt{2m}$$

$$= 3m \sqrt{2m}$$

$$\begin{aligned} \underline{\text{ex 66}} \quad \sqrt{169 s^5 t^{10}} &= \sqrt{169 s^4 t^{10}} \sqrt{s} \\ &= 13 s^2 t^5 \cdot \sqrt{s} \end{aligned}$$

$$\begin{aligned} \underline{\text{ex 70}} \quad -\sqrt[3]{64 y^{18}} \\ &= -4 y^6 \end{aligned}$$

$$\begin{aligned} \underline{\text{ex 72}} \quad -\sqrt{25 t^6 s^{20}} \\ &= -5 t^3 s^{10} \end{aligned}$$

$$\begin{aligned} \underline{\text{ex 80}} \quad -\sqrt{200 p^{13}} &= -\sqrt{100 p^{12}} \sqrt{2 p} \\ &= -10 p^6 \cdot \sqrt{2 p} \end{aligned}$$

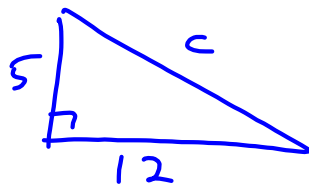
$$\begin{aligned} \underline{\text{ex 86}} \quad \sqrt[3]{-81 m^4 n^{10}} &= \sqrt[3]{-27 m^3 n^9} \sqrt[3]{3 m n} \\ &= -3 m n^3 \sqrt[3]{3 m n} \end{aligned}$$

$$\begin{aligned} \underline{\text{ex 90}} \quad -\sqrt[4]{32k^5m^{10}} &= -\sqrt[4]{16k^4m^8} \sqrt[4]{2km^2} \\ &= -2km^2 \sqrt[4]{2km^2} \end{aligned}$$

$$\underline{\text{ex 92}} \quad \sqrt{\frac{v^{13}}{49}} = \frac{\sqrt{v^{13}}}{7} = \frac{\sqrt{v^{12}} \sqrt{v}}{7} = \frac{v^6 \sqrt{v}}{7}$$

$$\underline{\text{ex 94}} \quad \sqrt[3]{\frac{y^{17}}{125}} = \frac{\sqrt[3]{y^{17}}}{5} = \frac{\sqrt[3]{y^{15}} \sqrt[3]{y^2}}{5} = \frac{y^5 \sqrt[3]{y^2}}{5}$$

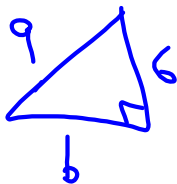
ex 108



$$\begin{aligned} a^2 + b^2 &= c^2 \\ 5^2 + 12^2 &= c^2 \\ 25 + 144 &= c^2 \\ \sqrt{169} &= \sqrt{c^2} \end{aligned}$$

$$13 = c$$

ex 110



$$\begin{aligned} a^2 + b^2 &= c^2 \\ 6^2 + b^2 &= 9^2 \\ 36 + b^2 &= 81 \\ -36 \quad -36 & \\ \hline \sqrt{b^2} &= \sqrt{45} \\ b &= \sqrt{9} \sqrt{5} \\ b &= 3\sqrt{5} \end{aligned}$$



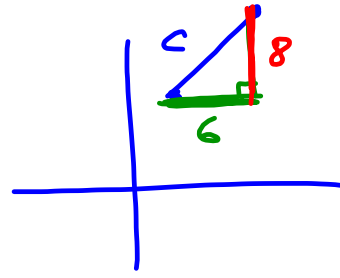
ex 114     $(\underline{8}, \underline{13})$      $(\underline{2}, \underline{5})$

$$8 - 2$$

$$13 - 5$$

$$6$$

$$8$$



$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$a^2 + b^2 = c^2$$

$$6^2 + 8^2 = c^2$$

$$36 + 64 = c^2$$

$$100 = c^2$$

$$10 = c$$

ex 118     $(-1, 2)$      $(5, 3)$

$$5 - (-1)$$

$$3 - 2$$

$$6$$

$$1$$

$$6^2 + 1^2 = c^2$$

$$36 + 1 = c^2$$

$$37 = c^2$$

$$\sqrt{37} = c$$

10.4 p. 632

ex 2

$$\begin{aligned} & \sqrt{25} - \sqrt{81} \\ &= 5 - 9 \\ &= -4 \end{aligned}$$

ex 4

$$\begin{aligned} & 4\sqrt{32} - 2\sqrt{8} \\ & 4\sqrt{16}\sqrt{2} - 2\sqrt{4}\sqrt{2} \\ & 4 \cdot 4\sqrt{2} - 2 \cdot 2\sqrt{2} \\ & 16\sqrt{2} - 4\sqrt{2} \\ & 12\sqrt{2} \end{aligned}$$

$$16x - 4x = 12x$$

ex 12

$$3\sqrt{11} - 5\sqrt{13} \quad \text{also } \sqrt{2} - \sqrt[3]{2}$$

can't do any more.

$$\sqrt{2} + \sqrt[4]{2}$$

$$\sqrt{2} + \sqrt[4]{4}$$

$$\sqrt{4}$$

ex 20

$$15 \sqrt[3]{81} + 4 \sqrt[3]{24}$$

$$15 \sqrt[3]{27} \sqrt[3]{3} + 4 \sqrt[3]{8} \sqrt[3]{3}$$

$$15 \cdot 3 \sqrt[3]{3} + 4 \cdot 2 \sqrt[3]{3}$$

$$45 \sqrt[3]{3} + 8 \sqrt[3]{3}$$

$$53 \sqrt[3]{3}$$

$$(2\sqrt{5} - \dots)(3\sqrt{5} - \dots)$$

$$6\sqrt{5}$$

$$(2 + \sqrt{3})(3 + \sqrt{3})$$

$$6 + 2\sqrt{3} + 3\sqrt{3} + \sqrt{9}$$

$$6 + 5\sqrt{3} + 3$$

$$9 + 5\sqrt{3}$$

$$\frac{4}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{4\sqrt{2}}{\sqrt{4}} = \frac{4\sqrt{2}}{2} = 2\sqrt{2}$$

$$\frac{1}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{5}}{5}$$

$$\frac{1}{\sqrt{2} + \sqrt{3}} \cdot \frac{\sqrt{2} - \sqrt{3}}{\sqrt{2} - \sqrt{3}} = \frac{\sqrt{2} - \sqrt{3}}{2 - 3}$$
$$= \frac{\sqrt{2} - \sqrt{3}}{-1}$$