

5.3 Practice

1) Write the expression in radical form.

$$r^{\frac{3}{7}} = \sqrt[7]{r^3} = (\sqrt[7]{r})^3$$

2) Write the expression in rational exponent

$$\sqrt[3]{(5y)^4} = (5y)^{\frac{4}{3}} = 5^{\frac{4}{3}} y^{\frac{4}{3}}$$

~~$\sqrt[3]{5y^4}$~~

Simplify each expression.

3) $64^{-\frac{1}{3}} = \frac{1}{64^{\frac{1}{3}}} = \frac{1}{\sqrt[3]{64}} = \frac{1}{4}$

5) $8^{\frac{2}{3}} = \sqrt[3]{8^2} = \sqrt[3]{64} = 4$
 $= (\sqrt[3]{8})^2 = 2^2 = 4$

7) $81^{\frac{1}{4}} = \sqrt[4]{81} = 3$
 $\star 81^{\frac{3}{4}} = \sqrt[4]{81^3} = (\sqrt[4]{81})^3 = 3^3 = 27$

9) $8\sqrt{5} + 3\sqrt{45}$
 $8\sqrt{5} + 3 \cdot 3\sqrt{5}$
 $8\sqrt{5} + 9\sqrt{5}$
 $\boxed{17\sqrt{5}}$

$\sqrt{45} = \sqrt{9 \cdot 5} = 3\sqrt{5}$

11) $\frac{\sqrt[4]{64}}{\sqrt[4]{2}} = \sqrt[4]{\frac{64}{2}} = \sqrt[4]{32} = \sqrt[4]{16 \cdot 2} = \boxed{2\sqrt[4]{2}}$

$2^4 = 16$

4) $\sqrt[4]{162x^{12}y^9} = 3x^3y^2\sqrt[4]{2y}$

$\sqrt[4]{162} = \sqrt[4]{81 \cdot 2} = 3\sqrt[4]{2}$

$\sqrt[4]{x^{12}} = x^{\frac{12}{4}} = x^3$

$\sqrt[4]{y^9} = y^{\frac{9}{4}} = y^2\sqrt[4]{y}$

6) $125^{\frac{1}{3}} = \sqrt[3]{125} = 5$

8) $100^{-\frac{1}{2}} = \frac{1}{100^{\frac{1}{2}}} = \frac{1}{\sqrt{100}} = \frac{1}{10}$

10) $r^{\frac{4}{5}} \cdot r^{\frac{2}{3}} = r^{\frac{4}{5} + \frac{2}{3}} = r^{\frac{12}{15} + \frac{10}{15}}$
 $= r^{\frac{22}{15}} = r^1 \cdot r^{\frac{7}{15}} = \frac{r \cdot \sqrt[15]{r^7}}{\sqrt[15]{r^7}}$

12) $(3m)^3 \cdot (27m^6)^{\frac{1}{3}}$

\downarrow
 $27m^3 \cdot 27^{\frac{1}{3}}(m^6)^{\frac{1}{3}}$
 $\downarrow \quad \downarrow$
 $\sqrt[3]{27} \quad m^2$
 \downarrow
 $3 \quad m^2$
 $27m^3 \cdot 3m^2 = \boxed{81m^5}$