

### Rewriting and Rationalizing

Write each expression in radical form.

1)  $(5n)^{\frac{1}{4}}$   $\sqrt[4]{5n}$

2)  $(6b)^{\frac{5}{2}}$   $(\sqrt{6b})^5$

3)  $(7x)^{\frac{1}{2}}$   $\sqrt{7x}$

4)  $x^{\frac{5}{2}}$   $\sqrt{x}^5$

5)  $(6n)^{\frac{1}{3}}$   $\sqrt[3]{6n}$

6)  $(10x)^{\frac{8}{5}}$   $(\sqrt[5]{10x})^8$

7)  $(2x)^{\frac{5}{3}}$   $(\sqrt[3]{2x})^5$

8)  $n^{\frac{3}{2}}$   $\sqrt{n}^3$

Write each expression in exponential form.

9)  $(\sqrt{6x})^3$   $(6x)^{\frac{3}{2}}$

10)  $(\sqrt[3]{3x})^4$   $(3x)^{\frac{4}{3}}$

11)  $(\sqrt[5]{10a})^3$   $(10a)^{\frac{3}{5}}$

12)  $(\sqrt{r})^3$   $r^{\frac{1}{2}}$

13)  $(\sqrt[3]{7a})^2$   $(7a)^{\frac{2}{3}}$

14)  $(\sqrt[4]{n})^7$   $n^{\frac{7}{4}}$

15)  $(\sqrt{x})^5$   $x^{\frac{1}{2}}$

16)  $(\sqrt[4]{p})^5$   $p^{\frac{5}{4}}$

Simplify.

17)  $81^{\frac{5}{4}}$   $3^5 = \boxed{243}$

18)  $81^{\frac{3}{2}}$   $9^3 = \boxed{729}$

19)  $64^{\frac{1}{3}}$   $\boxed{4}$

20)  $(49p^2)^{\frac{3}{2}}$   $(7p)^3 = \boxed{343p^3}$

21)  $(16n^4)^{\frac{3}{2}}$   $(4n^2)^3 = \boxed{64n^6}$

22)  $(v^9)^{\frac{4}{3}}$   $(v^3)^4 = \boxed{v^{12}}$

$$23) -\frac{4}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \boxed{\frac{-4\sqrt{5}}{5}}$$

$$24) \frac{5\sqrt{4}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \boxed{\frac{10\sqrt{3}}{3}}$$

$$25) \frac{\sqrt{3}}{5-4\sqrt{5}} \cdot \frac{5+4\sqrt{5}}{5+4\sqrt{5}}$$

$$\frac{5\sqrt{3} + 4\sqrt{15}}{25 + 20\sqrt{5} - 20\sqrt{5} - 16 \cdot 5}$$

$$\frac{5\sqrt{3} + 4\sqrt{15}}{-55} = \boxed{\frac{-5\sqrt{3} - 4\sqrt{15}}{55}}$$

$$26) \frac{2}{3\sqrt{3} + \sqrt{5}} \cdot \frac{3\sqrt{3} - \sqrt{5}}{3\sqrt{3} - \sqrt{5}} = \frac{6\sqrt{3} - 2\sqrt{5}}{27 - 3\sqrt{15} + 3\sqrt{15} - 5}$$

$$\frac{6\sqrt{3} - 2\sqrt{5}}{22} = \boxed{\frac{3\sqrt{3} - \sqrt{5}}{11}}$$

$$27) \frac{3\sqrt{5} - 2\sqrt{2}}{\sqrt{2} + 2} \cdot \frac{\sqrt{2} - 2}{\sqrt{2} - 2}$$

$$\frac{3\sqrt{10} - 6\sqrt{5} - 4 + 4\sqrt{2}}{2 - 2\sqrt{2} + 2\sqrt{2} - 4}$$

$$\frac{3\sqrt{10} - 6\sqrt{5} - 4 + 4\sqrt{2}}{-2}$$

$$\boxed{\frac{-3\sqrt{10} + 6\sqrt{5} + 4 - 4\sqrt{2}}{2}}$$

$$28) \frac{\sqrt{5} + \sqrt{2}}{4 + 5\sqrt{5}} \cdot \frac{4 - 5\sqrt{5}}{4 - 5\sqrt{5}} = \frac{4\sqrt{5} - 25 + 4\sqrt{2} - 5\sqrt{10}}{16 - 20\sqrt{5} + 20\sqrt{5} - 125}$$

$$\frac{4\sqrt{5} - 25 + 4\sqrt{2} - 5\sqrt{10}}{-109}$$

$$\boxed{\frac{-4\sqrt{5} + 25 - 4\sqrt{2} + 5\sqrt{10}}{109}}$$

$$29) \frac{\sqrt{3} + 4\sqrt{5}}{3 + 4\sqrt{5}} \cdot \frac{3 - 4\sqrt{5}}{3 - 4\sqrt{5}}$$

$$\frac{3\sqrt{3} - 4\sqrt{15} + 12\sqrt{5} - 80}{9 - 12\sqrt{5} + 12\sqrt{5} - 80}$$

$$\frac{3\sqrt{3} - 4\sqrt{15} + 12\sqrt{5} - 80}{-71}$$

$$\frac{3\sqrt{3} - 4\sqrt{15} + 12\sqrt{5} - 80}{-71}$$

$$\boxed{\frac{-3\sqrt{3} + 4\sqrt{15} - 12\sqrt{5} + 80}{71}}$$

$$30) \frac{2 - 4\sqrt{3}}{-2 - \sqrt{5}} \cdot \frac{-2 + \sqrt{5}}{-2 + \sqrt{5}} = \frac{-4 + 2\sqrt{5} + 8\sqrt{6} - 4\sqrt{15}}{4 - 2\sqrt{5} + 2\sqrt{5} - 5}$$

$$\frac{-4 + 2\sqrt{5} + 8\sqrt{6} - 4\sqrt{15}}{-1}$$

$$\boxed{4 - 2\sqrt{5} - 8\sqrt{6} + 4\sqrt{15}}$$