

**Dividing and Rationalizing Radicals**

1) Divide the following. Leave answer in simplest radical form.

$$\text{a) } \frac{\sqrt{24}}{\sqrt{3}} \quad \text{b) } \frac{6\sqrt{18}}{2\sqrt{6}} \quad \text{c) } \frac{5\sqrt{24}}{2\sqrt{18}}$$

2) Rationalize the denominator in the following.

$$\text{a) } \frac{40}{\sqrt{10}} \quad \text{b) } \frac{5}{2\sqrt{3}} \quad \text{c) } \frac{-2\sqrt{5}}{\sqrt{2a}} \quad \text{d) } 15\sqrt{\frac{6a}{5}}$$

$$\text{e) } \frac{2\sqrt{3} + 4}{\sqrt{3}} \quad \text{f) } \frac{5\sqrt{8} - 2\sqrt{5}}{\sqrt{6}} \quad \text{g) } \frac{-3\sqrt{18} + 7\sqrt{2}}{\sqrt{12}}$$

3) Simplify the following and rationalize the denominator if necessary.

$$\text{a) } \frac{4\sqrt{20a^3}}{\sqrt{18a}} \quad \text{b) } \frac{8\sqrt{32a^5}}{5\sqrt{24a}} \quad \text{c) } \frac{\sqrt[3]{16a^4}}{\sqrt[3]{81a}}$$

4) Determine a conjugate for each of the following, and then determine the product of each pair of conjugates.

$$\text{a) } 3\sqrt{2} + 5 \quad \text{b) } 1 - \sqrt{7} \quad \text{c) } 2\sqrt{a} + \sqrt{b}$$

5) Simplify. (Rationalize each denominator)

$$\text{a) } \frac{8}{\sqrt{5} + 2} \quad \text{b) } \frac{\sqrt{3}}{2 - \sqrt{6}} \quad \text{c) } \frac{\sqrt{7}}{\sqrt{7} - 2\sqrt{3}} \quad \text{d) } \frac{9\sqrt{5}}{\sqrt{11} - \sqrt{5}}$$

$$\text{e) } \frac{3\sqrt{2} + \sqrt{3}}{2\sqrt{3} + \sqrt{2}} \quad \text{f) } \frac{3 + 2\sqrt{5}}{3\sqrt{5} - 4} \quad \text{g) } \frac{2\sqrt{6} + 3\sqrt{2}}{\sqrt{2} - \sqrt{6}}$$

**Answers**

1) a)  $2\sqrt{2}$  b)  $3\sqrt{3}$  c)  $\frac{5\sqrt{3}}{3}$

2) a)  $4\sqrt{10}$  b)  $\frac{5\sqrt{3}}{6}$  c)  $-\frac{\sqrt{10a}}{a}$  d)  $3\sqrt{30a}$  e)  $\frac{6+4\sqrt{3}}{3}$  f)  $\frac{10\sqrt{3}-\sqrt{30}}{3}$  g)  $-\frac{\sqrt{6}}{3}$

3) a)  $\frac{4a\sqrt{10}}{3}$  b)  $\frac{16a^2\sqrt{3}}{15}$  c)  $\frac{2a\sqrt[3]{18}}{9}$

4) a)  $3\sqrt{2}-5; -7$  b)  $1+\sqrt{7}; -6$  c)  $2\sqrt{a}-\sqrt{b}; 4a-b$

5) a)  $8\sqrt{5}-16$  b)  $\frac{-2\sqrt{3}-3\sqrt{2}}{2}$  or  $-\sqrt{3}-\frac{3\sqrt{2}}{2}$  c)  $\frac{-7-2\sqrt{21}}{5}$  d)  $\frac{3\sqrt{55}+15}{2}$  e)  $\frac{\sqrt{6}}{2}$  f)  $\frac{42+17\sqrt{5}}{29}$

g)  $\frac{-9-5\sqrt{3}}{2}$