

## 1.5B Working with Radicals Handout

1. a)  $\sqrt{12} + \sqrt{27}$   
 b)  $\sqrt{20} + \sqrt{45}$   
 c)  $\sqrt{18} - \sqrt{8}$   
 d)  $\sqrt{50} + \sqrt{98} - \sqrt{2}$   
 e)  $\sqrt{75} + \sqrt{48} + \sqrt{27}$   
 f)  $\sqrt{54} + \sqrt{24} + \sqrt{72} - \sqrt{32}$   
 g)  $\sqrt{28} - \sqrt{27} + \sqrt{63} + \sqrt{300}$

2. a)  $\sqrt{2}(\sqrt{10} + 4)$   
 b)  $\sqrt{3}(\sqrt{6} - 1)$   
 c)  $\sqrt{6}(\sqrt{2} + \sqrt{6})$   
 d)  $2\sqrt{2}(3\sqrt{6} - \sqrt{3})$   
 e)  $\sqrt{2}(\sqrt{3} + 4)$   
 f)  $3\sqrt{2}(2\sqrt{6} + \sqrt{10})$   
 g)  $(\sqrt{5} + \sqrt{6})(\sqrt{5} + 3\sqrt{6})$   
 h)  $(2\sqrt{3} - 1)(3\sqrt{3} + 2)$   
 i)  $(4\sqrt{7} - 3\sqrt{2})(2\sqrt{7} + 5\sqrt{2})$   
 j)  $(3\sqrt{3} + 1)^2$   
 k)  $(2\sqrt{2} - \sqrt{5})^2$   
 l)  $(2 + \sqrt{3})(2 - \sqrt{3})$   
 m)  $(\sqrt{6} - \sqrt{2})(\sqrt{6} + \sqrt{2})$   
 n)  $(2\sqrt{7} + 3\sqrt{5})(2\sqrt{7} - 3\sqrt{5})$

3. a)  $\frac{1}{\sqrt{3}}$   
 d)  $\frac{\sqrt{1}}{\sqrt{2}}$   
 g)  $\frac{4\sqrt{2}}{\sqrt{8}}$   
 j)  $\frac{3\sqrt{6}}{4\sqrt{10}}$

4. a)  $\frac{1}{\sqrt{2} + 2}$   
 c)  $\frac{\sqrt{2}}{\sqrt{6} - 3}$   
 e)  $\frac{3}{\sqrt{5} - \sqrt{2}}$   
 g)  $\frac{2\sqrt{6}}{2\sqrt{6} + 1}$   
 i)  $\frac{\sqrt{2} + \sqrt{5}}{\sqrt{6} - \sqrt{10}}$

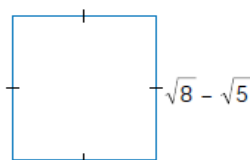
5. a)  $\sqrt[3]{16} + \sqrt[3]{54}$   
 c)  $2(\sqrt[3]{32}) + 5(\sqrt[3]{108})$   
 e)  $\sqrt[3]{16} - \sqrt[3]{54}$   
 g)  $2(\sqrt[3]{40}) - \sqrt[3]{5}$

b)  $\frac{2}{\sqrt{5}}$   
 e)  $\frac{5\sqrt{5}}{2\sqrt{3}}$   
 h)  $\frac{3\sqrt{5}}{\sqrt{3}}$   
 k)  $\frac{7\sqrt{11}}{2\sqrt{3}}$

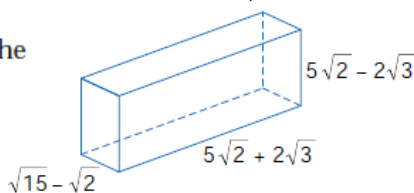
b)  $\frac{3}{\sqrt{5} - 1}$   
 d)  $\frac{2}{\sqrt{6} + \sqrt{3}}$   
 f)  $\frac{\sqrt{3}}{\sqrt{3} + \sqrt{2}}$   
 h)  $\frac{\sqrt{2} - 1}{\sqrt{2} + 1}$   
 j)  $\frac{2\sqrt{7} + \sqrt{5}}{3\sqrt{7} - 2\sqrt{5}}$

b)  $\sqrt[3]{24} + \sqrt[3]{81}$   
 d)  $\sqrt[3]{54} + 5(\sqrt[3]{16})$   
 f)  $\sqrt[3]{108} - \sqrt[3]{32}$   
 h)  $5(\sqrt[3]{48}) - 2(\sqrt[3]{162})$

13. **Measurement** Write and simplify an expression for the area of the square.



14. **Measurement** Express the volume of the rectangular prism in simplest radical form.



### Answers

1. a)  $5\sqrt{3}$  b)  $5\sqrt{5}$  c)  $\sqrt{2}$  d)  $11\sqrt{2}$  e)  $12\sqrt{3}$  f)  $5\sqrt{6} + 2\sqrt{2}$  g)  $5\sqrt{7} + 7\sqrt{3}$   
 2. a)  $2\sqrt{5} + 4\sqrt{2}$  b)  $3\sqrt{2} - \sqrt{3}$  c)  $2\sqrt{3} + 6$  d)  $12\sqrt{3} - 2\sqrt{6}$  e)  $\sqrt{6} + 4\sqrt{2}$  f)  $12\sqrt{3} + 6\sqrt{5}$  g)  $23 + 4\sqrt{30}$  h)  $16 + \sqrt{3}$  i)  $26 + 14\sqrt{14}$  j)  $28 + 6\sqrt{3}$  k)  $13 - 4\sqrt{10}$  l)  $1$  m)  $4$  n)  $-17$   
 3. a)  $\frac{\sqrt{3}}{3}$  b)  $\frac{2\sqrt{5}}{5}$  c)  $\frac{2\sqrt{7}}{7}$  d)  $\frac{\sqrt{2}}{2}$  e)  $\frac{5\sqrt{15}}{6}$  f)  $\frac{2}{3}$  g)  $2$  h)  $\sqrt{15}$  i)  $\sqrt{2}$  j)  $\frac{3\sqrt{15}}{20}$  k)  $\frac{7\sqrt{33}}{6}$  l)  $\frac{\sqrt{10}}{5}$   
 4. a)  $\frac{2 - \sqrt{2}}{2}$  b)  $\frac{3 + 3\sqrt{5}}{4}$  c)  $\frac{-3\sqrt{2} + 2\sqrt{3}}{3}$  d)  $\frac{2\sqrt{6} - 2\sqrt{3}}{3}$  e)  $\sqrt{5} + \sqrt{2}$  f)  $3 - \sqrt{6}$  g)  $\frac{24 - 2\sqrt{6}}{23}$  h)  $3 - 2\sqrt{2}$  i)  $\frac{5\sqrt{2} + 2\sqrt{3} + 2\sqrt{5} + \sqrt{30}}{4}$  j)  $\frac{52 + 7\sqrt{35}}{43}$   
 5. a)  $5\sqrt[3]{2}$  b)  $5\sqrt[3]{3}$  c)  $19\sqrt[3]{4}$  d)  $13\sqrt[3]{2}$  e)  $-\sqrt[3]{2}$  f)  $\sqrt[3]{4}$  g)  $3\sqrt[3]{5}$  h)  $4\sqrt[3]{6}$  i)  $13$  j)  $13 - 4\sqrt{10}$  k)  $13$  l)  $38\sqrt{15} - 38\sqrt{2}$