Section 1.1

1. Evaluate.

a) $|-3|-|-2|$ _____

b) $-|-3-(-4)|$ _____

c) $-|2|-|-2|$ _____

d) $|-4|+(-4)$ _____

3. Simplify. Let the variables be any real number.

a) $\sqrt{9x^7}$ _____

b) $\sqrt{9x^6}$ _____

c) $\sqrt[3]{-x^9}$ _____

d) $\sqrt[3]{(3-x)^6}$ _____

e) $\sqrt[4]{x^7y^8}$ _____

f) $\sqrt[4]{(x+1)^5}$ _____

Section 1.3

4. Simplify. All variables represent non-negative real numbers.

a) $\sqrt{75}$ _____ **b)** $\sqrt[3]{40}$ _____

c) $-\frac{3}{4}\sqrt{80}$ _____ **d)** $\sqrt[3]{-250}$ _____

e) $\sqrt[4]{81x^6y^7}$ _____ **f)** $\sqrt[3]{-16x^3y^4}$ _____

5. Write as an entire radical. All variables represent non-negative real numbers.

a) $3\sqrt{5}$ _____ **b)** $3\sqrt[3]{5}$ _____

c) $3\sqrt[4]{5}$ _____ **d)** $3\sqrt[5]{5}$ _____

e) $-2xy^2\sqrt{x^2y^3}$ _____ **f)** $-2xy^2\sqrt[3]{x^2y^4}$ _____

Section 1.4

6. Simplify. All variables represent positive numbers.

a) $\sqrt{28} + \sqrt{175}$ _____

b) $\sqrt{32} - \sqrt{98}$ _____

c) $5\sqrt{8x} - 3\sqrt{18x}$ _____

d) $x\sqrt{18} + 4x\sqrt{8} - 5x\sqrt{3}$ _____

Section 1.5

7. Find the indicated operation and simplify. All variables represent positive numbers.

a) $3\sqrt{2}(5\sqrt{7} - 4\sqrt{3})$ _____

b) $3\sqrt[3]{2}(2\sqrt[3]{4} - 4\sqrt[3]{2})$ _____

c) $(2 - \sqrt{3})(2 + \sqrt{3})$ _____

d) $(2 - \sqrt{3})^2$ _____

8. Rationalize the denominator.

a) $\frac{1}{\sqrt{5}}$ _____ **b)** $\frac{1}{\sqrt[3]{5}}$ _____

c) $\frac{1}{2-\sqrt{3}}$ _____ **d)** $\frac{\sqrt{x}+y}{\sqrt{x}-y}$ _____

3. Change to simplest radical form.

a) $\sqrt{32}$ _____ **b)** $\sqrt{80}$ _____

c) $\sqrt{75}$ _____ **d)** $\sqrt[3]{-54}$ _____

e) $\sqrt[3]{16}$ _____ **f)** $\sqrt[3]{-72}$ _____

g) $3\sqrt{45}$ _____ **h)** $\frac{3}{2}\sqrt{128}$ _____

4. Express in simplest radical form. All variables represent non-negative real numbers.

a) $\sqrt{x^3y^2}$ _____

b) $\sqrt{49x^3y^5}$ _____

c) $\sqrt{18x^6}$ _____

d) $\sqrt{25x^5y^{11}}$ _____

e) $\sqrt{\frac{5}{x^4}}$ _____

f) $\sqrt{\frac{x^4y^5}{144}}$ _____

5. Write as an entire radical.

a) $2\sqrt{3}$ _____

b) $-4\sqrt{5}$ _____

c) $3\sqrt{4}$ _____

d) $\frac{2}{3}\sqrt{5}$ _____

e) $2\sqrt[3]{3}$ _____

f) $-4\sqrt[3]{5}$ _____

g) $3\sqrt[3]{4}$ _____

h) $\frac{2}{3}\sqrt[3]{5}$ _____

5. Simplify each expression.

a) $6\sqrt{2} + 3\sqrt{2}$

b) $5\sqrt{3} - 9\sqrt{3}$

c) $7\sqrt{32} + 4\sqrt{2}$

d) $7\sqrt{48} + 4\sqrt{3}$

e) $3\sqrt[3]{54} + 5\sqrt[3]{16}$

f) $5\sqrt[4]{48} - 2\sqrt[4]{243}$

g) $7\sqrt{63} - 2\sqrt{28}$

h) $3\sqrt{40} - 8\sqrt{90}$

i) $4\sqrt{12} + 2\sqrt{27} - 3\sqrt{75}$

j) $5\sqrt{18} - 4\sqrt{50} - 2\sqrt{72}$

k) $4\sqrt{50} + 3\sqrt{12} - 5\sqrt{27}$

l) $5\sqrt{72} + 3\sqrt{48} - 4\sqrt{128}$

m) $\sqrt{162} - \sqrt{50} + \sqrt{75} - \sqrt{108}$

n) $\sqrt{48} + \sqrt{8} - \sqrt{27} - \sqrt{32}$

3. Find each product and simplify.

a) $\sqrt{5}(\sqrt{8}+\sqrt{32})$

b) $2\sqrt{3}(7\sqrt{5}-5\sqrt{3})$

c) $2\sqrt[3]{5}(3\sqrt[3]{3}-\sqrt[3]{25})$

d) $2\sqrt[3]{2}(5\sqrt[3]{4}+3\sqrt[3]{2})$

e) $(1-\sqrt{2})(1-\sqrt{2})$

f) $(1-\sqrt{2})(1+\sqrt{2})$

g) $(4+\sqrt{3})(4+\sqrt{3})$

h) $(4+\sqrt{3})(4-\sqrt{3})$

3. Solve the following radical equations.

a) $\sqrt{2t-3} = 5$

b) $\sqrt{3t+4} = -2$

c) $\sqrt{1-3x} = -2$

d) $2\sqrt{x-1} = x$

g) $\sqrt{2x+1} = x-7$

h) $\sqrt{3x+10} + 5 = 2x$