1. State the restrictions.

   a. $\sqrt{3x+7}$ b. $2\sqrt{5x^{12}y^5}$ c. $\dfrac{5}{\sqrt{x-3}}$

2. Write each as an entire radical:

   a. $14\sqrt{7}$ b. $4\sqrt[3]{11}$ c. $3\sqrt[4]{5}$

3. Arrange the numbers in increasing order.

   4, $4\sqrt{2}$, $\sqrt{15}$, $2\sqrt{5}$, and $\sqrt{27}$

4. Completely simplify each of the following.

   a. $2\sqrt{54}-\sqrt{48}+6\sqrt{24}+2\sqrt{300}$ b. $(3\sqrt{6}-2)^2$

   c. $\dfrac{3\sqrt{5}}{2\sqrt{8}}$ d. $\dfrac{9\sqrt{7}}{\sqrt{35}}$ e. $\dfrac{5\sqrt{10}-\sqrt{5}}{\sqrt{8}}$

5. Perform the following operations and write in simplest radical form.

   a. $(2\sqrt{x}-5)(-3\sqrt{x}-1)$ c. $\dfrac{\sqrt{49a^4}}{\sqrt{7a^3}}$

   b. $6x\sqrt{x^5}(\sqrt{x}-3\sqrt{x^3})$

6. Write in simplest radical form.

a. $4x^3y^2\sqrt{80x^3y^{12}}$ b. $2x^5y^3\sqrt[3]{40x^6y^2}$

7. The width of a rectangle is $2\sqrt{8x}$ and the length is $5\sqrt{18x}$.

a. Determine the perimeter of the rectangle.

b. Determine the area of the rectangle.

c. Determine the length of the diagonal of the rectangle.

8. Solve and check for extraneous roots.

a. $\sqrt[3]{x-6}=4$ b. $\sqrt{y+4}-7=-2$ c. $-8+\sqrt{2z+1}=3$

9. For diamonds of comparable quality, the cost, *C*, in dollars, is related to the mass, *m*, in carats, by the formula $m=\sqrt{\frac{C}{700}}, C\geq 0.$ What would be the cost, in dollars, of a 2-carat diamond?