Multiplication of Radicals

Multiplication of radicals is fairly straight forward, using the following rule

$$\sqrt[n]{a}\sqrt[n]{b} = \sqrt[n]{ab}$$

Examples:

$$\sqrt{18}\sqrt{2} = \sqrt{36} = 6$$

$$\sqrt[3]{3c^2d^5} \bullet \sqrt[3]{9c^4d^7}$$
$$\sqrt[3]{3\cdot 9} \bullet \sqrt[3]{c^2\cdot c^4} \bullet \sqrt[3]{d^5\cdot d^7}$$
$$\sqrt[3]{27} \bullet \sqrt[3]{c^6} \bullet \sqrt[3]{d^{12}}$$
$$3c^2d^4$$

$$\sqrt{3}\left(\sqrt{5}+\sqrt{2}\right)$$
$$\sqrt{3}\sqrt{5}+\sqrt{3}\sqrt{2}$$
$$\sqrt{15}+\sqrt{6}$$

$$\left(\sqrt{10}+\sqrt{2}\right)\left(\sqrt{10}-\sqrt{2}\right)$$
$$\sqrt{10}\sqrt{10}+\sqrt{10}\sqrt{2}-\sqrt{10}\sqrt{2}-\sqrt{2}\sqrt{2}$$
$$\sqrt{100}-\sqrt{4}$$
$$10-2$$
$$8$$

Note the use of the Distributive Property

$$\left(\sqrt{x}+y\right)\left(\sqrt{x}+2y\right)$$
$$\sqrt{x}\sqrt{x}+y\sqrt{x}+2y\sqrt{x}+y\cdot 2y$$
$$\sqrt{x^2}+3y\sqrt{x}+2y^2$$
$$x+3y\sqrt{x}+2y^2$$