

1) Simplify by combining like radical terms. Assume all variables represent positive numbers.

a)  $8\sqrt{11} - 8\sqrt{3} + 4\sqrt{11} + 2\sqrt{3}$

$$= 12\sqrt{11} - 6\sqrt{3}$$

b)  $4\sqrt{3x^3} - \sqrt{12x} = 4x\sqrt{3x} - \sqrt{4 \cdot 3x}$

$$= 4x\sqrt{3x} - 2\sqrt{3x}$$

$$= (4x - 2)\sqrt{3x}$$

2) Multiply and if possible simplify. Assume all variables represent positive numbers

a)  $\sqrt{x}(4 + \sqrt{x}) = 4\sqrt{x} + \sqrt{x^2}$

$$= 4\sqrt{x} + x$$

b)  $(1 + \sqrt{x})^2$

$$= (1 + \sqrt{x})(1 + \sqrt{x})$$

$$= 1 + 2\sqrt{x} + \sqrt{x^2}$$

$$= 1 + 2\sqrt{x} + x$$

3) Rationalize each denominator. Assume all variables represent positive numbers.

$$\frac{3}{x-\sqrt{2}}$$

$$= \frac{3}{x-\sqrt{2}} \cdot \frac{(x+\sqrt{2})}{(x+\sqrt{2})} = \frac{3x + 3\sqrt{2}}{x - \cancel{2\sqrt{x}} + \cancel{2\sqrt{x}} - \sqrt{2}^2}$$

$$= \boxed{\frac{3x + 3\sqrt{2}}{x - 2}}$$