

$$\begin{aligned} (1) & (2\sqrt{5} \cdot 3\sqrt{7}) + (2\sqrt{5} \cdot -5\sqrt{3}) + (4\sqrt{11} \cdot 3\sqrt{7}) + (4\sqrt{11} \cdot -5\sqrt{3}) \\ (2) & 6\sqrt{35} - 10\sqrt{15} + 12\sqrt{77} - 20\sqrt{33} \end{aligned}$$

Step 1: Multiply the first two terms, the outer two terms, the inner two terms, and the last two terms.

Step 2: Multiply the numbers outside the radicals, then multiply the numbers inside the radicals of each term. Simplify, if possible.

When rationalizing the denominator of a fraction, multiply the numerator and denominator by the conjugate of the denominator.

Example 4: Rationalize.

$$\begin{aligned} & \frac{5}{\sqrt{5}-2} \\ (1) & \frac{5}{\sqrt{5}-2} \cdot \frac{\sqrt{5}+2}{\sqrt{5}+2} \\ (2) & \frac{5 \cdot \sqrt{5} + 5 \cdot 2}{\sqrt{5} \cdot \sqrt{5} + 2 \cdot \sqrt{5} - 2 \cdot \sqrt{5} + 2 \cdot -2} \\ (3) & \frac{5\sqrt{5} + 10}{5 + 2\sqrt{5} - 2\sqrt{5} - 4} \end{aligned}$$

Step 1: Multiply the numerator and denominator by the conjugate of the denominator.

Step 2: Begin to simplify the numerator by multiplying radical 5 and 2 by 5. Begin to simplify the denominator by multiplying the binomials.

Step 3: Complete all multiplications, then add all like terms.

Step 4: Complete the simplification of the denominator by subtracting 4 from 5.

Step 5: Divide both terms in the numerator by the number in the denominator.

Answer: $5\sqrt{5} + 10$