

Factor -96 and b^5 to find perfect cubes: $\sqrt[3]{(-1) \cdot 8 \cdot 12 \cdot b^5} = \sqrt[3]{(-1)^3 \cdot 2^3 \cdot 12 \cdot b^3 \cdot b^2}$

Separate the factors into individual radicals: $\sqrt[3]{(-1)^3} \cdot \sqrt[3]{2^3} \cdot \sqrt[3]{12} \cdot \sqrt[3]{b^3} \cdot \sqrt[3]{b^2}$

Simplify, using the property $\sqrt[3]{x^3} = x$: $-1 \cdot 2 \cdot \sqrt[3]{12} \cdot b \cdot \sqrt[3]{b^2} = -2b\sqrt[3]{12b^2}$