

Exercise A.10.53 Simplify

$$\sqrt[3]{16x^4y} - 3x\sqrt[3]{2xy} + 5\sqrt[3]{-2xy^4}$$

Solution

By the properties of roots (Note A.10.A),

$$\sqrt[3]{16x^4y} - 3x\sqrt[3]{2xy} + 5\sqrt[3]{-2xy^4}$$

$$= \sqrt[3]{2^3 \cdot 2x^3xy} - 3x^2\sqrt[3]{2xy} + 5\sqrt[3]{(-1)(2)xy^3y}$$

$$= 2x\sqrt[3]{2xy} - 3x^2\sqrt[3]{2xy} + 5(-1)y\sqrt[3]{2xy}$$

$$= \boxed{(2x - 3x^2 - 5y)\sqrt[3]{2xy}}. \quad \square$$