HW 01   Solutions

§1.4

2a) $\dfrac{\sqrt[3]{4}}{\sqrt[3]{108}} = \dfrac{4^{1/3}}{108^{1/3}} = \left(\dfrac{4}{108}\right)^{1/3} = \left(\dfrac{2}{54}\right)^{1/3} = \left(\dfrac{1}{27}\right)^{1/3} = \dfrac{1}{3}$

2b) $27^{2/3} = \left(27^{1/3}\right)^2 = (3)^2 = 9$

2c) $2x^2(3x^5)^2 = 2x^2(9x^{10}) = 18x^{12}$

2d) $(2x^{-2})^{-3}x^{-3} = \dfrac{1}{(2x^{-2})^3} \cdot \dfrac{1}{x^3} = \dfrac{1}{8x^{-6}} \cdot \dfrac{1}{x^3} = \dfrac{1}{8x^{-3}} = \dfrac{x^3}{8} = \left(\dfrac{x}{2}\right)^3$

OR $(2x^{-2})^{-3}x^{-3} = (2x^{-2}\cdot x)^{-3} = (2x^{-1})^{-3} = 2^{-3}x^3 = \dfrac{x^3}{8}$

2e) $\dfrac{3a^{3/2}\cdot a^{1/2}}{a^{-1}} = \dfrac{3a^2}{a^{-1}} = 3a^3$

2f) $\dfrac{\sqrt{a}\cdot\sqrt{b}}{\sqrt[3]{ab}} = \dfrac{(a\sqrt{b})^{1/2}}{(ab)^{1/3}} = \dfrac{(a\cdot b^{1/2})^{1/2}}{a^{1/3}b^{1/3}} = \dfrac{a^{1/2}b^{1/4}}{a^{1/3}b^{1/3}} = \dfrac{a^{1/6}}{b^{1/12}}$

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§1.5 **3)** a) $f(x) = b^x$

b) $(-\infty, \infty)$

c) $(0, \infty)$

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§ 1.5, #3) Not 1-1. $f(2) = 2$ AND $f(6) = 2$.

#4) This is 1-1. each output has a
unique input.

Additional Thing: $f(x) = 2x + 4^x$.

$$\text{Let } f^{-1}(6) = y \Longleftrightarrow$$

$$f(y) = 2y + 4^y = 6$$

Check values, $\boxed{y = 1}$