

HW 7B: 2, 4, 6, 7

2.) $y \propto x^3$ a.) y if x is doubled if x is multiplied by 2
 x^3 is multiplied by $(2)^3 = 8$
 \therefore y is multiplied by 8

b.) y if x is divided by 10 if x is divided by 10
 x^3 is divided by $(10)^3 = 1,000$
 \therefore y is divided by 1,000

c.) y if x is increased by 20% if x is increased by 20% ($\times 1.2$)
 x^3 is multiplied by $(1.2)^3 = 1.728$
 \therefore x^3 is increased by 72.8%
 \therefore y is increased by 72.8%

d.) x if y is multiplied by 2.5

If y is multiplied by 2.5
 y^3 is multiplied by 2.5

$$\therefore x \text{ is multiplied by } \sqrt[3]{2.5} \approx 1.36$$

4.) $V \propto y^3$; $y=3$, $V=30$

a.) V when $y=12$

y	3	12
V	30	?

$\nearrow \times 4$

If y is multiplied by 4
 y^3 is multiplied by $(4)^3 = 64$
 $\therefore V$ is multiplied by 64

$$30 \times 64 = 1,920$$

b.) y when $V=180$

y	3	?
V	30	180

$\nearrow \times 6$

If V is multiplied by 6
 y^3 is multiplied by 6
 $\therefore y$ is multiplied by $\sqrt[3]{6}$

$$\therefore 3 \sqrt[3]{6} \approx 5.45$$

b.) Capacity $\propto d^3$, when $d=6\text{cm}$, $C=40\text{mL}$

a.) Find C when $d=4\text{cm}$

d	6	4
C	40	?

$\nearrow \times 2/3$

$$d \times 2/3$$

$$d^3 \times (2/3)^3 = 8/27$$

$$\frac{40 \cdot 8}{27} = \frac{320}{27} \approx 11.9\text{mL}$$

b.) Find d when $C=30\text{mL}$

d	6	?
C	40	30

$\searrow \times 3/4$

$$C \times 3/4$$

$$d^3 \times 3/4$$

$$d \times \sqrt[3]{3/4}$$

$$\therefore 6 \times \sqrt[3]{3/4} \approx 5.45\text{cm}$$

7.) $V \propto l^3$

a.) $l \times 1.05$

$$l^3 \times (1.05)^3 \approx 1.158$$

$$\therefore V \times 1.158$$

$$\therefore 15.8\% \text{ increase}$$

b.) $V \times 2$

$$l^3 \times 2$$

$$l \times \sqrt[3]{2} \approx 1.2599$$

$$\approx 26.09\% \text{ increase}$$