Solution to Assignment #1 ("Paper Homework")

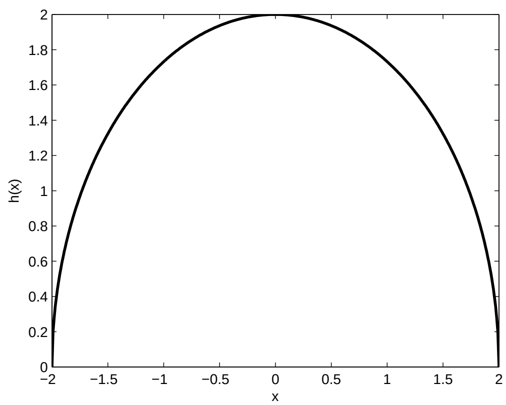
Sec 1.1 - Prob. 34 [2 pts]

$$h(x) = \sqrt{4 - x^2}\,.$$

$$\begin{aligned} 4 - x^2 &\geq 0 \\ x^2 &\leq 4 \\ |x| &\leq 2\,. \end{aligned}$$

So

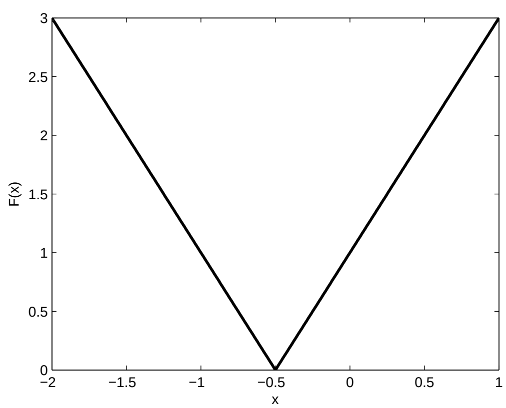
$$D = [-2, 2] = \{x \in \mathbb{R} : -2 \leq x \leq 2\}\,.$$



Sec 1.1 - Prob 40. [2 pts]

$$F(x) = |2x + 1|$$

Since the set of real number $\mathbb{R}$ is the domain for both $|x|$ and $2x + 1$, we conclude that it is also the domain of $F(x)$.



Sec 1.2 - Prob 26 [2 pts]
(a) By using the "Power Regression" procedure on a graphing device, we see that the power model

$$T = 1.00043\, d^{1.49}$$

fits well with the data.

(b) According to Kepler's Third Law of Planetary Motion:

$$\begin{aligned} T^2 &\propto d^3 \\ T^2 &= c \cdot d^3 \\ T &= \sqrt{c} \cdot d^{1.5}\,. \end{aligned}$$

Hence, the model corroborate Kepler's Third Law.
Sec 1.3 - Prob 40 [2 pts] $f(x) = \tan(x)$, $g(x) = \frac{x}{x-1}$, $h(x) = \sqrt[3]{x}$. To compute $f \circ g \circ h$, we do it step-by-step from inside to outside:

$$\begin{aligned} f \circ g \circ h &= f(g(h(x))) \\ &= f(g(\sqrt[3]{x})) \\ &= f\left((\frac{\sqrt[3]{x}}{\sqrt[3]{x}-1} \right) \\ &= \tan\left(\frac{\sqrt[3]{x}}{\sqrt[3]{x}-1} \right)\,. \end{aligned}$$

Sec 1.3 - Prob 44 [2 pts]

$$G(x) = \sqrt[3]{\frac{x}{1+x}}\,.$$

We can choose

$$f(x) = \sqrt[3]{x} \qquad \text{and} \qquad g(x) = \frac{x}{1+x}\,.$$