1 Theta Parameters

The function $\theta(x)$ (the *Heaviside* or *unit step function*) is a defined as:

$$\theta(x) = \begin{cases} 1 & \text{for } x > 0 \\ 0 & \text{for } x < 0 \end{cases}$$

This function is discontinuous at $x = 0$ and is generally taken to have a value of $\theta(0) = 1/2$.

Make sketches of the following functions, by hand, on axes with the same scale and domain. Briefly describe, using good scientific writing that includes both words and equations, the role that the number two plays in the shape of each graph:

(a) $y = \theta(x)$

(b) $y = 2 + \theta(x)$

(c) $y = \theta(2 + x)$

(d) $y = 2\theta(x)$

(e) $y = \theta(2x)$