

# Homework #1

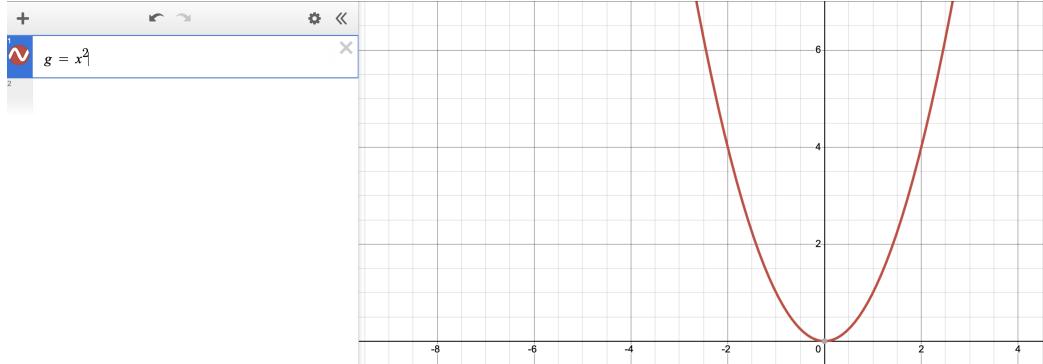
PHYS 4D: Modern Physics

Donald Aingworth IV

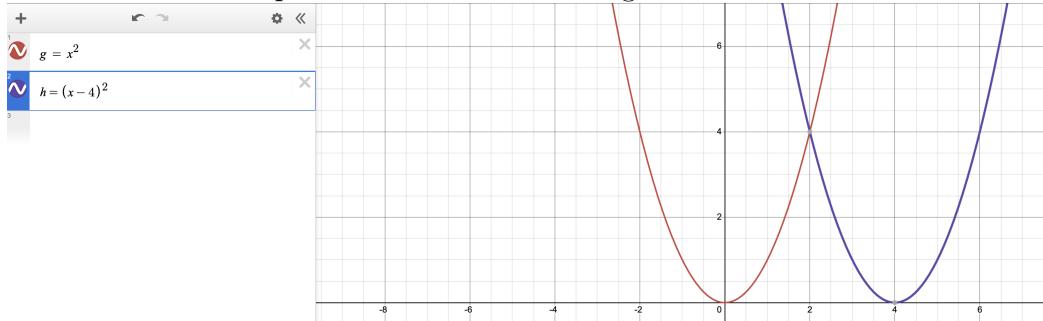
January 26, 2026

## 1 Exercise 1

The shape drawn is a parabola with its lowest point at  $(0, 0)$ , as shown below.

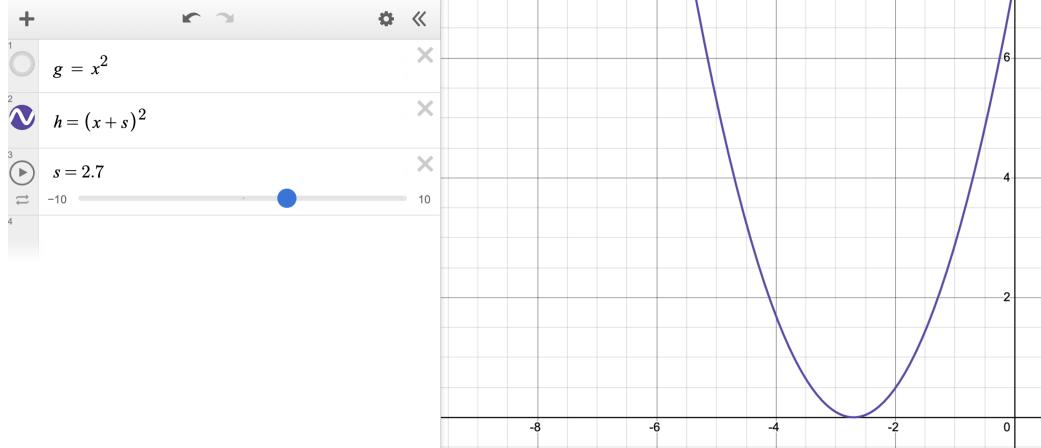


Scrolling (pinching on a tablet) zooms in and out. Adding  $h = (x - 4)^2$  adds a second blue parabola 4 units to the right and blue.



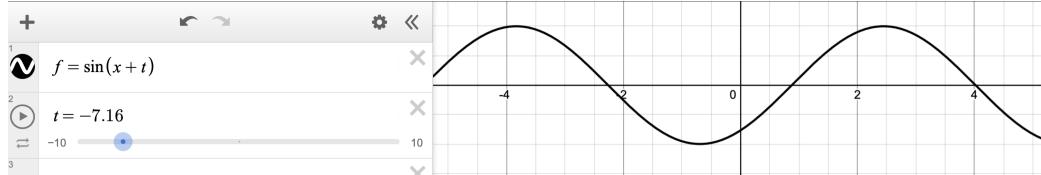
Click the symbol next to the graph name to show or hide it. A variable not indicated will require a new variable (e.g.  $s$ ) that can use a slider. Bounds

can be set and value variation can be automated.

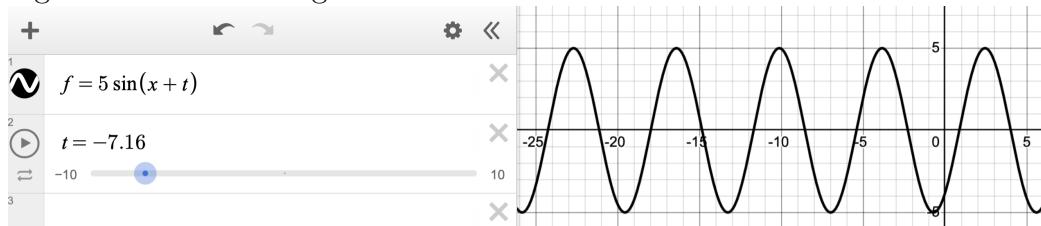


## 2 Exercise 2

The function  $f = \sin(x + t)$  is a sine wave. As  $t$  increases, the function appears to go left, and vice versa.

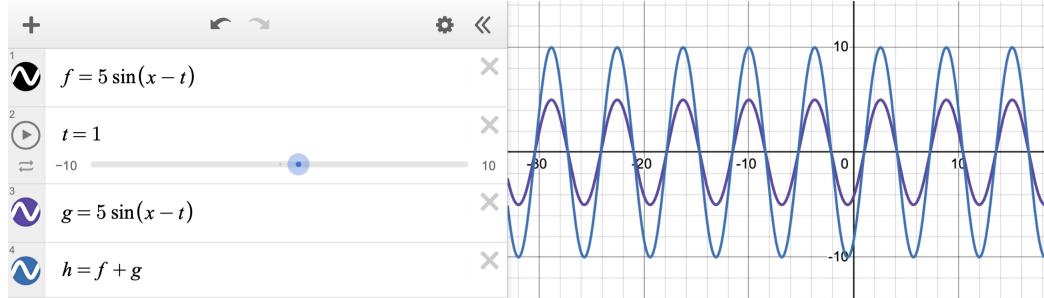


Switching to  $f = 5 \sin(x + t)$  increases the amplitude of the wave. Changing the  $+$  to a  $-$  changes the direction the wave moves when animated.

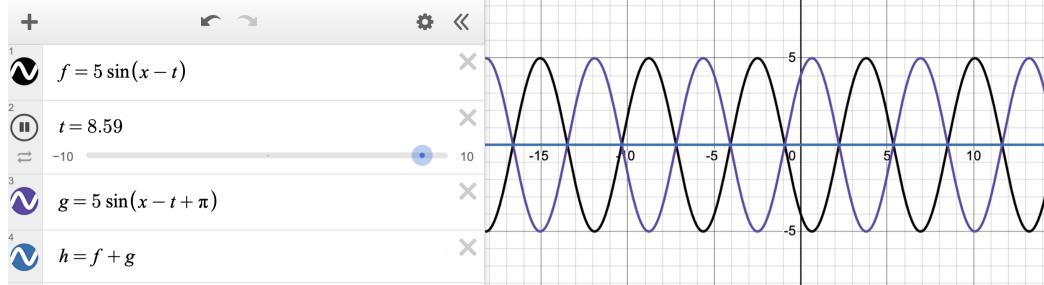


### 3 Exercise 3

Superposition can be done by adding functions.



Sine functions have a phase of  $2\pi$ , so they repeat every  $2\pi$  radians.



Constructive interference means waves work together for total value. Destructive interference means waves work against e/o.