- 9. [8 points] The following problem parts are not related.
  - **a**. [3 points] The function g(t), shown in the graph below, is a sinusoidal function with
    - $\bullet$  period 6
    - midline y = 15
    - and y-intercept (0, 15)

Using the fact that g(-0.41) = 20, find all other solutions to g(t) = 20 on the domain [0, 12] and illustrate on the graph where they fall using dots.



**b.** [5 points] In the unit circle shown below, the ray at angle  $\theta$  to the positive x-axis intersects the unit circle at the coordinates (h, 0.9).

h =

*t* =

(i) What is the value of h? Show all relevant work. Give your final answer in exact form, or accurate to two decimal places.





(iii) Find the value for an angle  $\phi$  (in degrees), between 90° and 180°, such that  $\sin(\phi) = 0.9$ . Show all relevant work. Give your final answer in terms of  $\theta$  or as a number rounded to two decimal places.

0

θ = \_\_\_\_\_

φ = \_\_\_\_\_°

0

(iv) Find **all** possible values of an angle  $\omega$  (in degrees) between 0 and 360° such that  $\cos(\omega) = 0.9$ . Show all relevant work. Give your final answer in terms of  $\theta$  or as a number rounded to two decimal places.