Math-19 Homework #15

Problems

1). Consider the function:

$$f(x) = 2\tan(4\pi x - \pi) + 1$$

a). What is the period P?

b). What is the horizontal translation b?

c). What is the phase angle ϕ?

d). What is the y-intercept?

e). Sketch one cycle of the graph in the interval $(b, b + P)$ and then extend the sketch back to the y-intercept.

2). Two 1 kg masses are each suspended on a spring with $k = \pi^2$ and are stretched downward by 2 units. The first spring is released at $t = 0$. The second spring is released at $t = 3$.

a). Find $f_1(t)$ for the first mass.

b). Find $f_2(t)$ for the second mass.

c). What is the phase difference between the two masses?

3). Evaluate:

$$\cot\left(\cos^{-1}\frac{x}{\sqrt{1+x^2}}\right)$$

4). A water tower is located 500 ft from a building. An observer looks at the tower from a window in the building. The angle of depression to the bottom of the tower is $45°$. The angle of elevation to the top of the tower is $15°$. How tall is the tower (to the nearest foot)?