

## 2. [12 points]

- a. [2 points] The graph of an odd function  $y = f(x)$  contains the point  $(-2, 4)$ . What other point must be in the graph of  $y = f(x)$ ?

*Solution:*  $(2, -4)$

- b. [2 points] The graph of an invertible function  $g(x)$  contains the point  $(3, 7)$ . What point must be in the graph of  $y = g^{-1}(x)$ ?

*Solution:*  $(7, 3)$

- c. [4 points] The function  $h(x)$  is obtained by applying the following transformations to the function  $y = \sqrt{1+x}$  in this exact order:

- i) A vertical shift up by 5 units.
- ii) A reflection about the  $y$ -axis.
- iii) A horizontal compression by  $\frac{1}{7}$ .
- iv) A horizontal shift to the left by 3 units .

Find a formula for  $h(x)$ .

*Solution:*  $h(x) = 5 + \sqrt{1 - 7(x + 3)} = 5 + \sqrt{-7x - 20}$ .

- d. [4 points] Let  $f(x) = (\sin(x^2) + 3)^2$  and  $g(x) = x^2$ . Find formulas for the functions  $h(x)$  and  $w(x)$  that satisfy:

i)  $f(x) = g(w(x))$   $w(x) = \underline{\hspace{10em}}$

ii)  $f(x) = h(g(x))$   $h(x) = \underline{\hspace{10em}}$

*Solution:*  $w(x) = \sin(x^2) + 3$        $h(x) = (\sin(x) + 3)^2$