2. [16 points]

a. [4 points] The domain and range of the function $y = f(x)$ are $[-2, 6)$ and $(-\infty, -10]$, respectively. What is the domain and range of $g(x) = 1 - f(\frac{1}{4}(x + 8))$?

Solution: Domain: $[-16, 16)$ Range: $[11, \infty)$

b. [2 points] If $f(x) = |x^3|$, then the function $f(x)$ is (circle your answer)

Solution: $\boxed{\text{EVEN}}$ ODD NEITHER

c. [2 points] Complete the following sentence:

Solution: If $f(x) = 2^x$, then the graph of $g(x) = f(x + 3)$ can be obtained by applying a vertical stretch by a factor of **8** to the graph of $y = f(x)$.

d. [4 points] Find the equations of the vertical and horizontal asymptotes (if any) of the following functions. If a function does not have vertical or horizontal asymptotes write "None".

Solution:

i) $y = 3e^{-0.4x} - 2$

Vertical asymptote: **None** Horizontal asymptote: $y = -2$.

ii) $y = 1 - 7\log(3x + 1)$

Vertical asymptote: $x = -\frac{1}{3}$ Horizontal asymptote: **None**

e. [2 points] Find two exact values of $-\pi < \theta \leq \pi$, measured in radians, such that $\cos\theta = \cos(A)$, where $A = \frac{11}{5}\pi$ radians.

Solution:

$$\theta = \frac{1}{5}\pi, \ -\frac{1}{5}\pi.$$

f. [2 points] Let $f(x)$ be a periodic function that has amplitude 4 and let $g(x) = 3f(5x)$. Find the amplitude of the function $g(x)$.

Solution: Amplitude of $g(x) = 12$