1. Find the derivative of the following function: \( f(x) = \sqrt{x} + \sqrt{x} \)

Answer 1.) \( f'(x) = \)

2. If \( f(x) = 4x^3 + 3e^x - 10 \), then \( f'(2) = \)

[14] 1.) Find the derivative of the following function: \( f(x) = \sqrt{x} + \sqrt{x} \)

[15] 2.) If \( f(x) = \frac{4x^3 + 3e^x - 10}{x - 4} + \frac{1}{x} \), then \( f'(2) = \)
3.) Find the equation(s) of the horizontal asymptote(s) of the following function. SHOW ALL STEPS.

\[ g(x) = \frac{x^2 + 4}{x + 4} \]

Answer 3.)

4.) Find the following limit.

\[ \lim_{x \to 3} \frac{-2(x - 2)^3(x - 8)^4}{(x - 3)^8(x - 10)^5} = \]
5.) Let \( f(x) = x^2 - 5 \). Use the limit definition of derivative to find \( f'(3) \).

What is the slope of the tangent line at \( x = 3 \)?

6.) Express the given quantity as a single logarithm (SIMPLIFY your answer):

\[
\ln 5 - 2\ln 3 + 4\ln 2 - 3\ln 1 = 
\]
7.) If \( g(x) = 3x - 4 \), then \( g^{-1}(x) = \) _______________________.

Graph \( y = g(x) \), \( y = g^{-1}(x) \), \( y = \frac{1}{g(x)} \)

[10] 8.) Sketch the graph of an example of a function \( f \) that satisfies all of the given conditions:

Domain of \( f = [-4, 6) \), range of \( f = (-\infty, 5] \), not 1:1,
continuous everywhere except at \( x = -2, 2 \),
differentiable everywhere except at \( x = -2, 2, 4 \),
\( \lim_{x\to-2^-} f(x) = -\infty \), \( \lim_{x\to-2^+} f(x) = -\infty \), \( \lim_{x\to-3} f(x) = 4 \)
[ 3 pts extra credit if your function also satisfies \( f'(1) = 0 \), \( f'(x) > 0 \) for \( x \in (1,2) \),
\( f'(x) = 0 \) for \( x \in (0,1) \)]