

Any answers which require logarithms to be expressed should be put in terms of natural or common logarithms. Show all work.

1. **(3 points)** If $f(x) = 2x^2 - 3x$, simplify the expression $f(a + h) - f(a)$.

2. **(3 points)** Find the equation of the line through the points $(-2, 8)$ and $(2, 2)$.

3. **(6 points)** Identify the domains of the following functions:
 - (a) **(3 points)** $g(t) = \sqrt{3 - t} - \sqrt{2 + t}$

 - (b) **(3 points)** $f(x) = \frac{2x^3 - 5}{x^2 + x - 6}$

4. **(8 points)** There are currently 2000 inhabitants of the luckless town of Dunwich, MA, and its population *decreases* by 7% each year due to emigration, death, and mysterious disappearances.
 - (a) **(4 points)** Construct a function $f(t)$ to describe the population of Dunwich in t years.

 - (b) **(4 points)** The remaining denizens of the town will abandon it when there are only 100 people left. When will this occur?

5. **(2 point bonus)** If $f(x)$ is an odd function and $g(x)$ is an even function, what (if anything) can be said about $f \circ f$, $f \circ g$, $g \circ f$, and $g \circ g$? Justify your claims on the back of this paper.