

Name _____

Student Number _____

Show all work. Label your answers clearly.

1. Let $f(x) = 4x^2 - 3x + 2$. Find and simplify $\frac{f(x+h)-f(x)}{h}$.

2. Gary the gull is hovering above the Puget Sound. His height in feet above the Sound after t seconds is given by the following:

$$f(t) = \begin{cases} 40 & 0 \leq t \leq 6 \\ t^2 - 22t + 136 & 6 < t \leq 13 \\ 19 & 13 < t \leq 15 \\ 8t - 101 & 15 < t \leq 20 \end{cases}$$

a) How high is Gary after 16 seconds?

b) When is Gary nearest to the water? What is his height above the water at that time?

c) For what time(s) is Gary moving upward?

d) What is the range of f ?

e) Another gull, Gertrude, is hovering above the Sound. Her height is given by $g(t) = 2t + 1$. When are Gertrude and Gary at the same height?