

### BC Calculus – NON Calculator Free Response Practice 3

Name \_\_\_\_\_ Pd \_\_\_\_\_

The rate, in calories per minute, at which a person using an exercise machine burns calories is modeled by the function  $f$ . In the figure,  $f(t) = -\frac{1}{4}t^3 + \frac{3}{2}t^2 + 1$  for  $0 \leq t \leq 4$  and  $f$  is piecewise linear for  $4 \leq t \leq 24$ .

- Find  $f'(22)$ . Indicate units of measure.
- For the time interval  $0 \leq t \leq 24$ , at what time  $t$  is  $f$  increasing at its greatest rate? Show the reasoning that supports your answer.
- Find the total number of calories burned over the time interval  $6 \leq t \leq 18$  minutes.
- The setting on the machine is now changed so that the person burns  $f(t) + C$  calories per minute. For this setting, find  $C$  so that an average of 15 calories per minute is burned during the time interval  $6 \leq t \leq 18$ .

