OR: If the temp increases to 24°, my bill will decrease approx 17 cents.

3. (7 points) Suppose that $f(T)$ is the cost to heat my house, in dollars per day, when the outside temperature is T degrees Fahrenheit.

(a) What does $f'(23) = -0.17$ mean in the context of this problem?

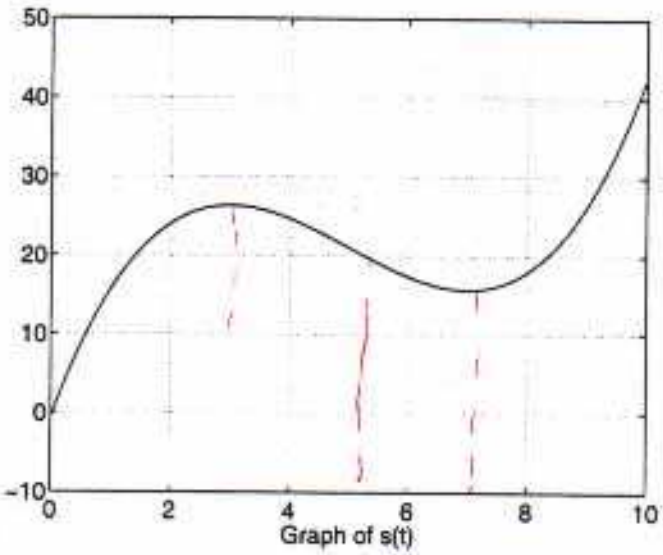
When the temperature is 23°F, my costs are decreasing at the rate of approximately 17¢/day per degree.

(b) If $f(23) = 7.54$, and $f'(23) = -0.17$, what is the approximate cost to heat my house when the outside temperature is 20 degrees Fahrenheit?

$f(20) \approx f(23) - 0.17(20-23)$

$= 7.54 + 0.17(3) =$ \$8.05 per day

4. (8 points) An object is moving on a straight line so that its distance (measured in feet) to the right of a fixed point on the line at time t (measured in seconds) is given by the function s whose graph is in the following figure.



(a) At what times (approximately) is the object moving to the right? to the left?

The object is moving to the right for $0<t<3$ and $7<t<10$. To the left for $3<t<7$.

(b) At what times (approximately) does the object have positive acceleration? negative acceleration? (Explain what properties of the graph give you this information.)

Acceleration is positive when the second derivative is positive. This is when the graph is concave up or for $2<t<5$ & $8<t<10$. Accel. is neg when graph is concave down or $0<t<2$, $5<t<8$.

(c) At what times (approximately) is the velocity of the object increasing? Explain.

Velocity is increasing when acceleration is positive — i.e., $5<t<10$.