Math 220 - Fall 2006 Exam 1 Solutions

2. $2+3\cos(\frac{2\pi}{5}(x-\frac{5}{2}))$ or $2+3\sin(\frac{2\pi}{5}(x-\frac{5}{4})$. There are other equivalent correct answers.

4. (a) Average velocity is

$$\begin{aligned}\frac{s(3+h)-s(3)}{(3+h)-3} &= \frac{4(3+h)-(3+h)^2-4(3)+3^2}{h}\\ &= \frac{4h-6h-h^2}{h}\\ &= -2-h.\end{aligned}$$

(b) Average velocity is

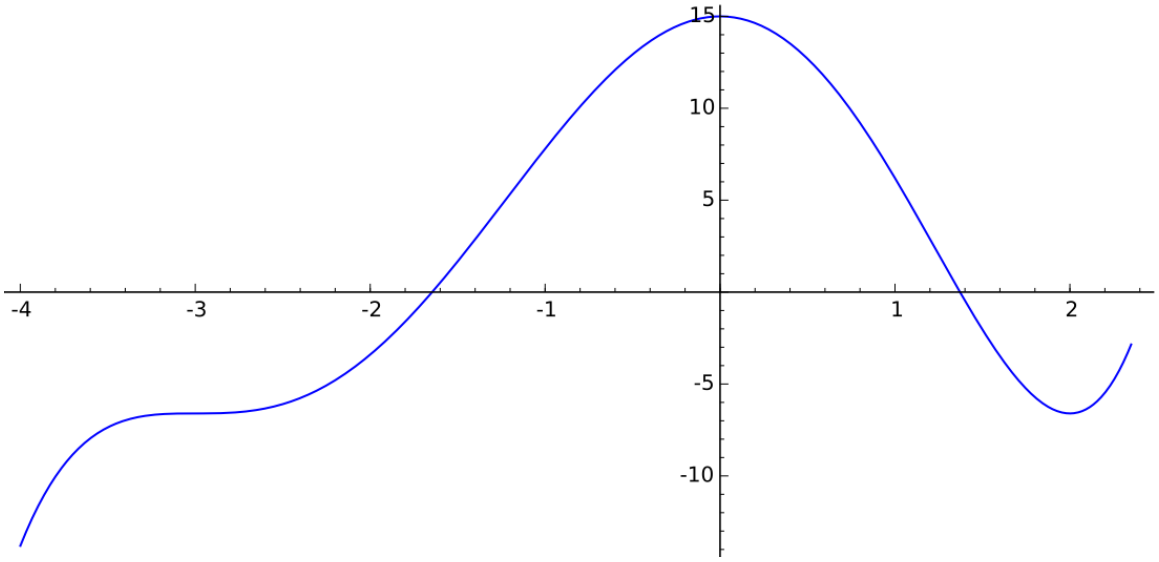
$$\begin{aligned}\frac{s(3)-s(2.75)}{3-2.75} &= \frac{4(3)-3^2-4(\frac{11}{4})+\left(\frac{11}{4}\right)^2}{3-\frac{11}{4}}\\ &= 4\cdot(1-\frac{144}{16}+\frac{121}{16})\\ &= -\frac{7}{4}.\end{aligned}$$

(c) Since $s'(t)=4-2t$, we have $s'(4)=4-8=-4$.

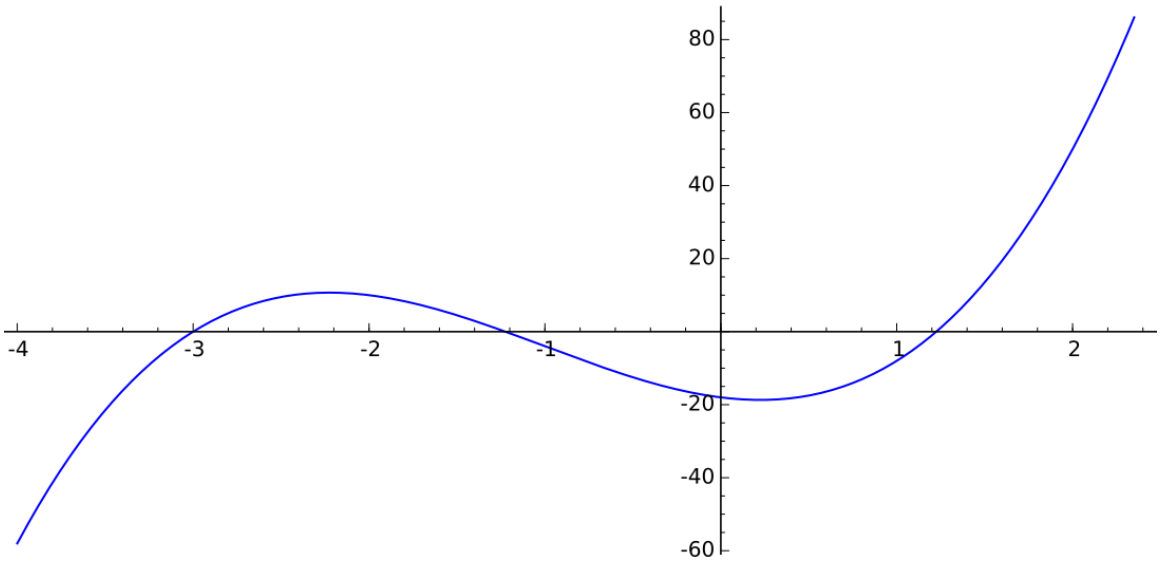
(d) We have $s(3)=4(3)-3^2=3$ and $s'(3)=-2$ (by part (a)). So the equation is

$$y-3=-2(x-3).$$

5. Possible graph of $f(x)$ (could be shifted up or down by a constant):



Possible graph of $f''(x)$:



7.(c) $v'(x) = -\frac{1}{2}x^{-3/2} + 1$.