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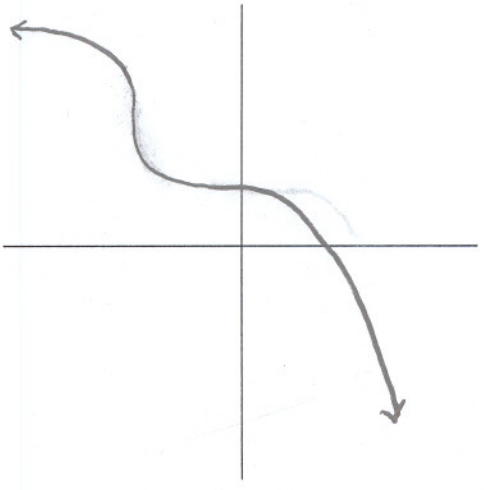
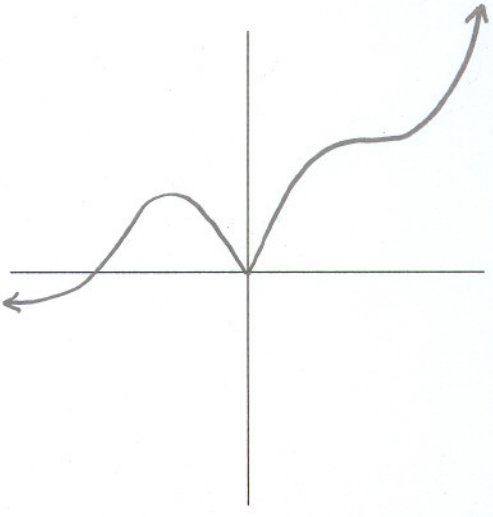
Sketch the derivatives of the following functions.



[a]



[b]

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When a fixed quantity of a gas is compressed to a volume of x liters, the pressure exerted by the gas (in atmospheres) is given by $f(x)$. Interpret the following algebraic statements, making sure to specify the units of all numbers you mention.
NOTE: Do NOT use the phrases "rate of change", "tangent line", "secant line" or "derivative of".

[a] $\lim_{h\to 0}\dfrac{f(7+h)-f(7)}{h}=-0.5$

[b] $\dfrac{f(6.75)-f(7.25)}{-0.5}=0.3$

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Find $\dfrac{d^2y}{dx^2}$ for the following functions. Simplify your answers completely.

[a] $y=\dfrac{3x^2-4}{\sqrt[3]{x}}$

[b] $y=\left(2\sqrt{x}-x^2\right)\left(\dfrac{1}{3\sqrt{x}}+3x\right)$

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Find a quadratic function $f(x)$ such that $f(1)=4$, $f'(1)=-3$ and $f''(1)=2$.

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Find a quadratic function $f(x)$ such that $f(-1)=2$, $f'(-1)=-3$ and $f''(-1)=4$.

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