October 11

How do you find a local minimum?
How do you find a point of inflection?

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Students will verbally explain how to evaluate integrals
(using the words:
antiderivative, constant, substitution…)

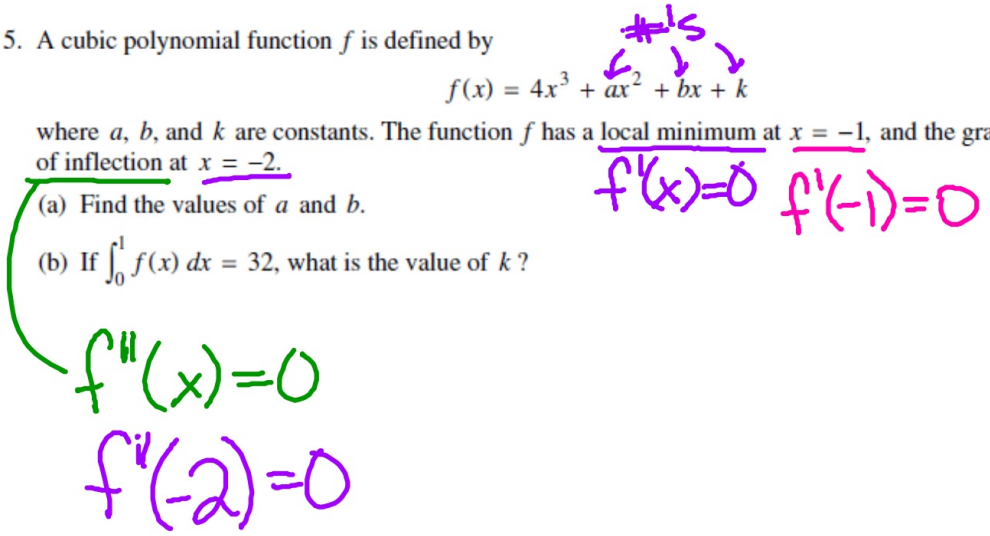
5. A cubic polynomial function f is defined by

$$f(x) = 4x^3 + ax^2 + bx + k$$

where a, b, and k are constants. The function f has a local minimum at $x = -1$, and the graph of f has a point of inflection at $x = -2$.

(a) Find the values of a and b.

(b) If $\int_0^1 f(x)\,dx = 32$, what is the value of k?



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Question 5

A cubic polynomial function f is defined by

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(a) Find the values of a and b.

(b) If $\int_0^1 f(x)\,dx = 32$, what is the value of k?

(a) $f'(x) = 12x^2 + 2ax + b$ $f''(x) = 24x + 2a$ $f'(-1) = 12 - 2a + b = 0$ $f''(-2) = -48 + 2a = 0$ $a = 24$ $b = -12 + 2a = 36$	5 : 1 : $f'(x)$ 1 : $f''(x)$ 1 : $f'(-1) = 0$ 1 : $f''(-2) = 0$ 1 : $a,\ b$
(b) $\int_0^1 (4x^3 + 24x^2 + 36x + k)\,dx$ $= x^4 + 8x^3 + 18x^2 + kx\Big\|_{x=0}^{x=1} = 27 + k$ $27 + k = 32$ $k = 5$	4 : 2 : antidifferentiation < −1 > each error 1 : expression in k 1 : k