Today...

- Antiderivatives.
- Position, velocity, acceleration.
- Maybe some graphing.

Antiderivatives - going backward

If $f'(x) = 6x^2 + 4x - 1$, then

(A) $f(x) = 12x + 4$

(B) $f(x) = 2x^3 + 2x^2 - x$

(C) $f(x) = 2x^3 + 2x^2 - x + 2$

(D) $f(x) = 2x^3 + 2x^2 - x + C$

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If $f'(x) = x^n$, which of the following could be f(x)?

(A) $$f(x) = \frac{1}{n+1}x^{n+1}$$

(B) $$f(x) = \frac{1}{n+1}x^{n+1} + C$$

(C) $$f(x) = nx^{n-1}$$

(D) $$f(x) = nx^{n-1} + C$$

(E) $$f(x) = x^n + C$$

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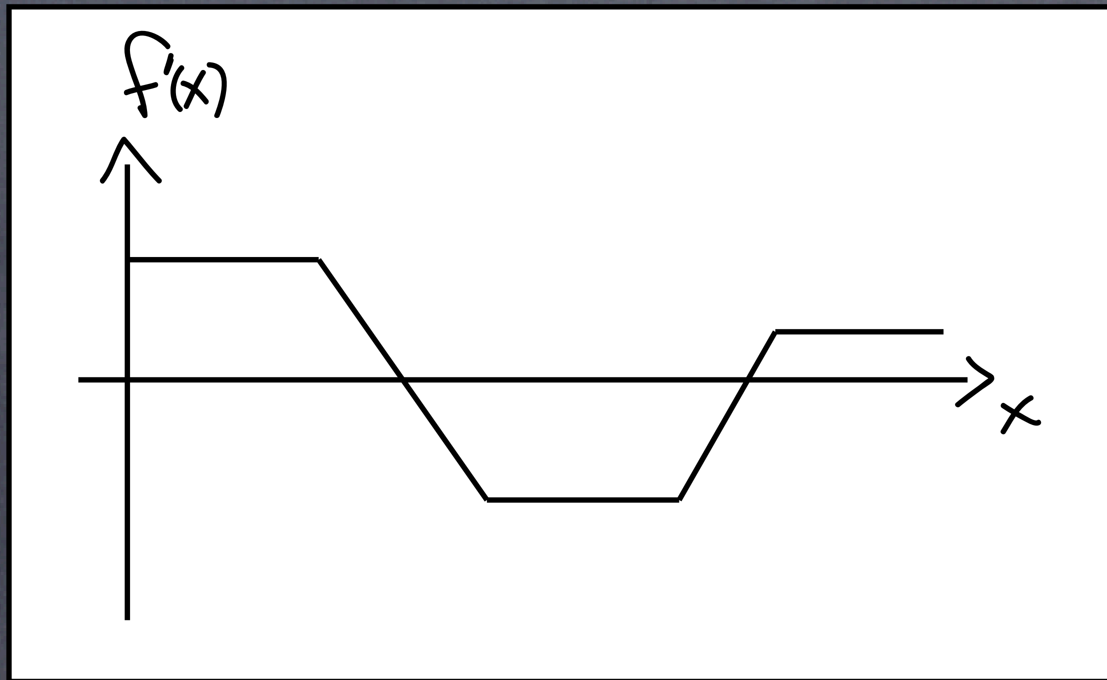

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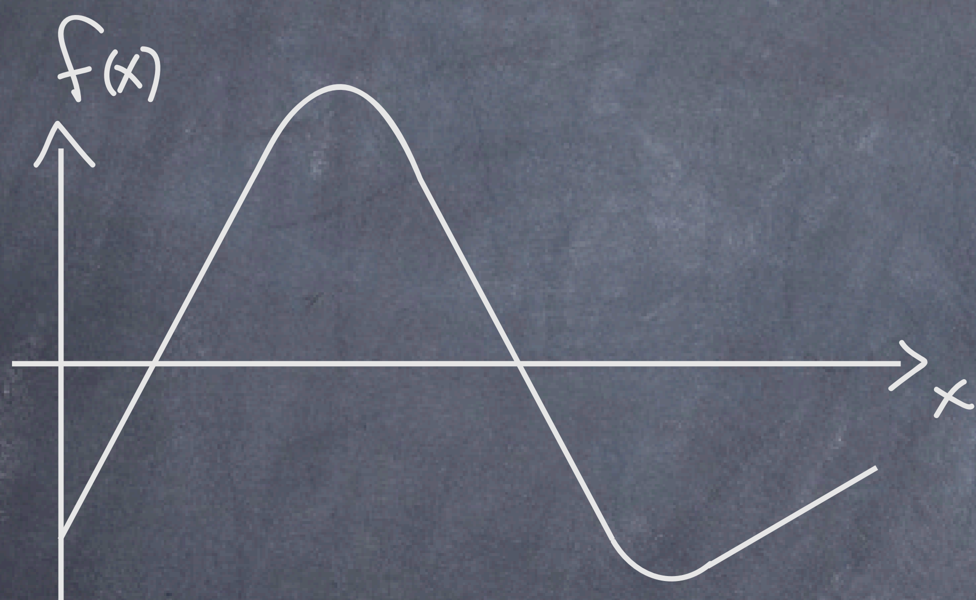

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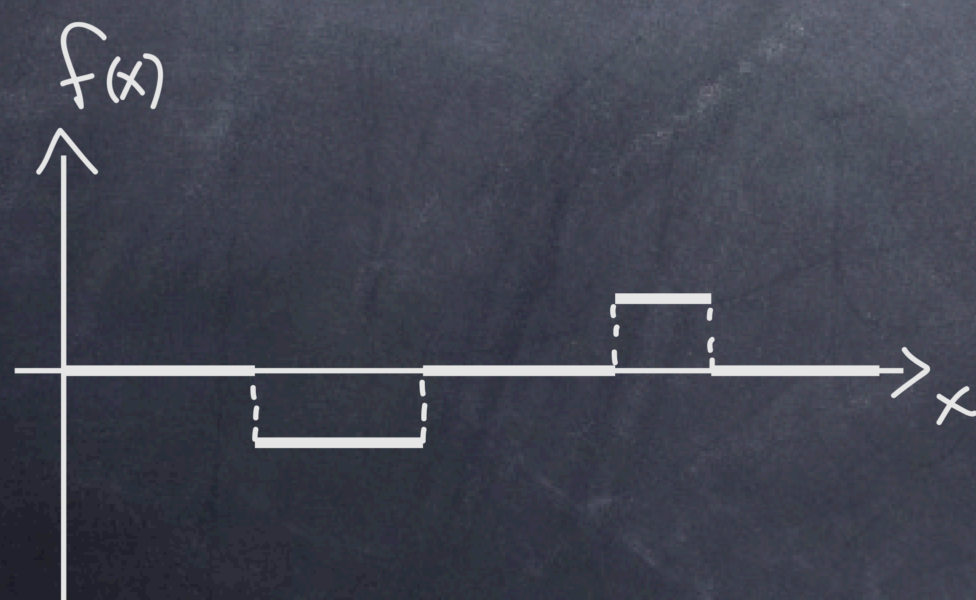

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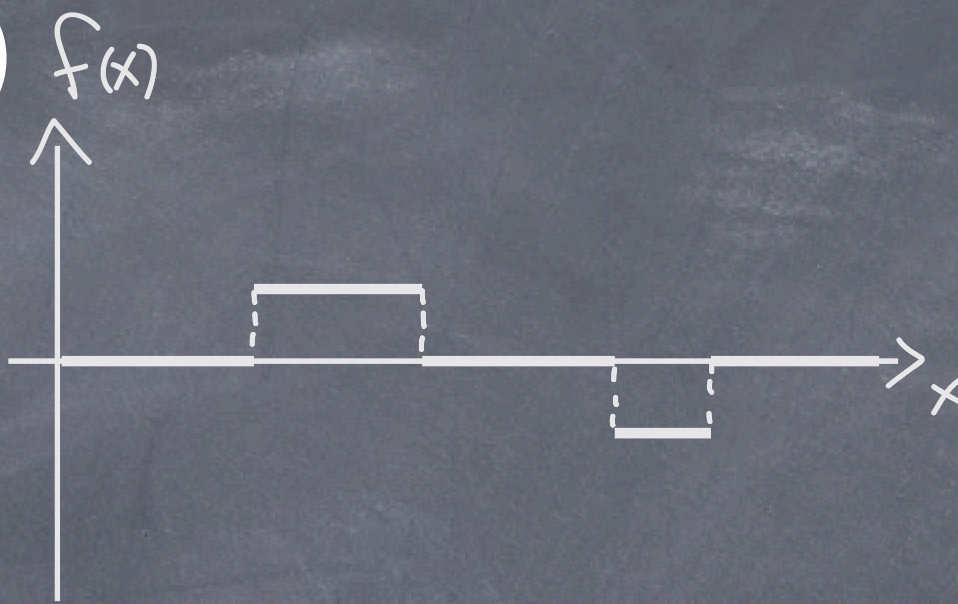

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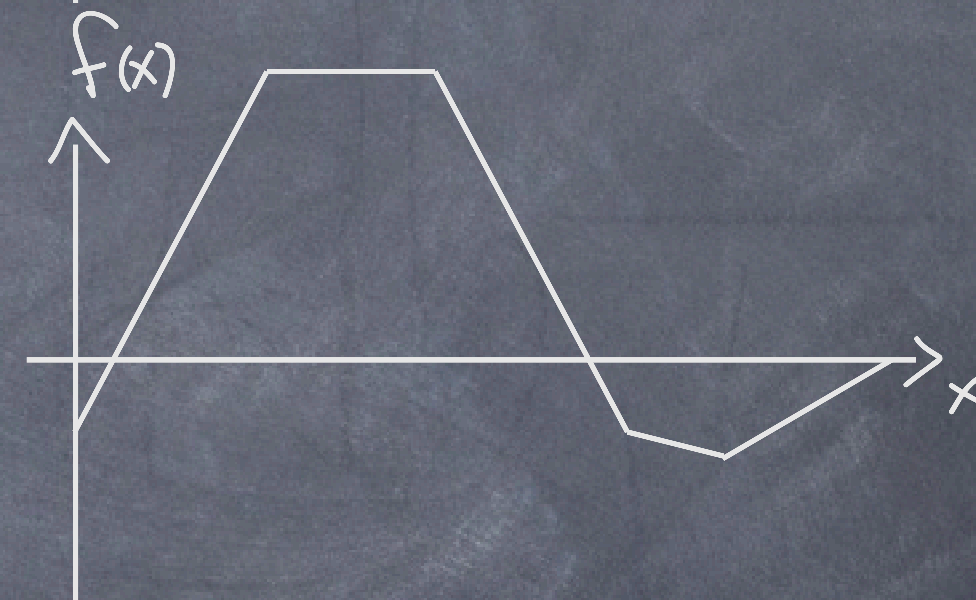

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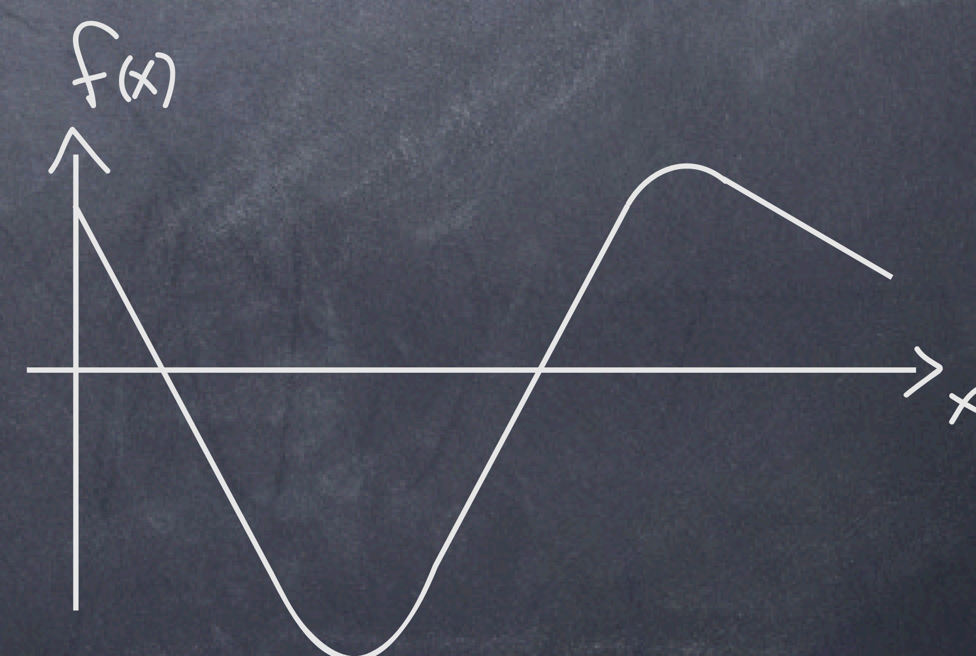

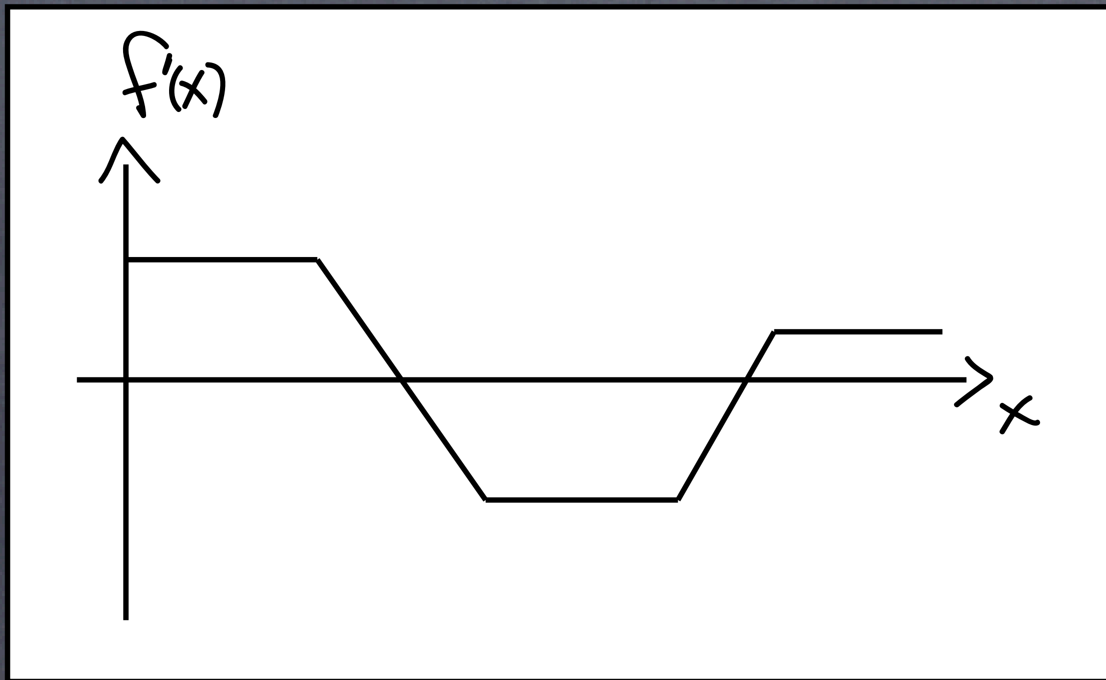

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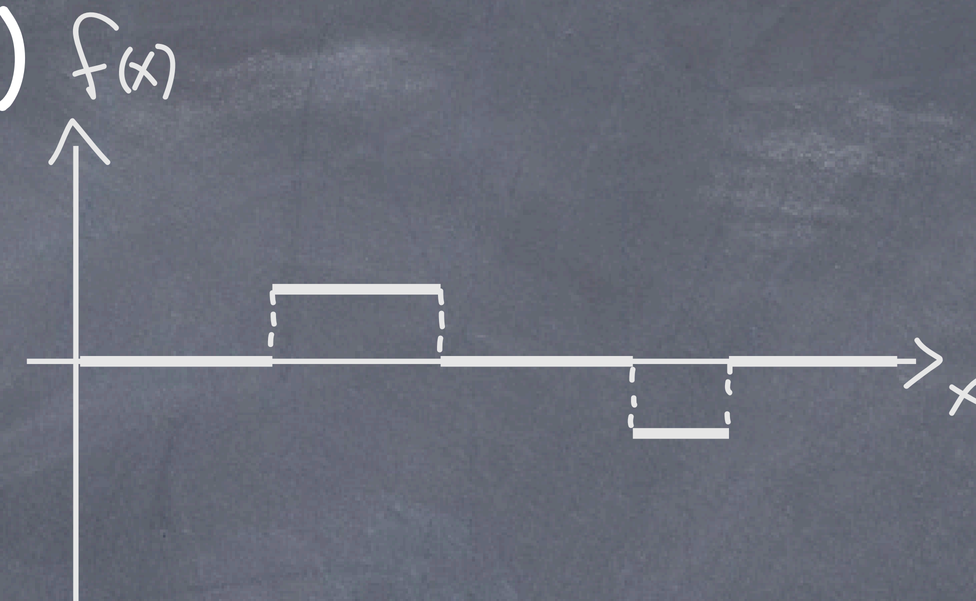

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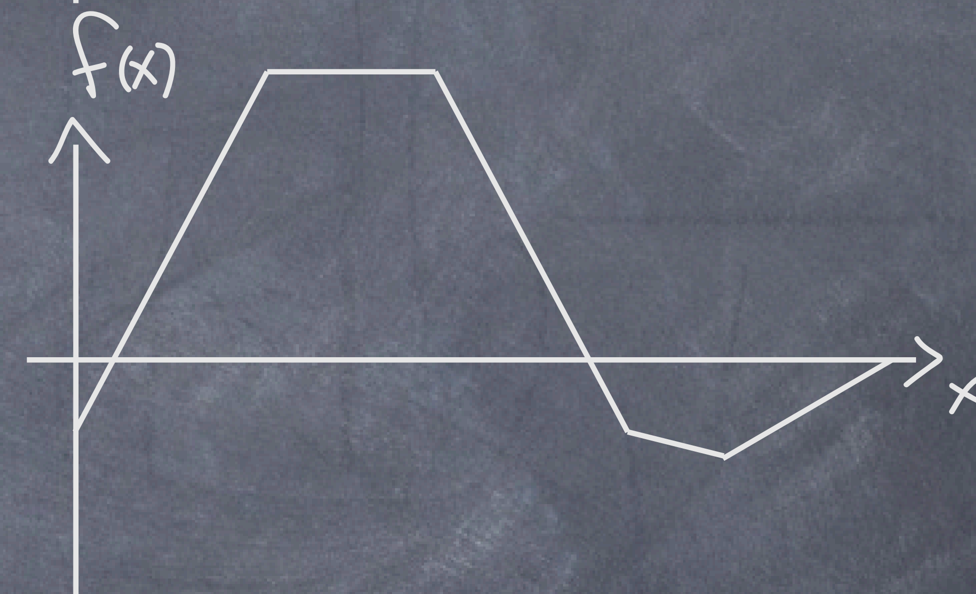

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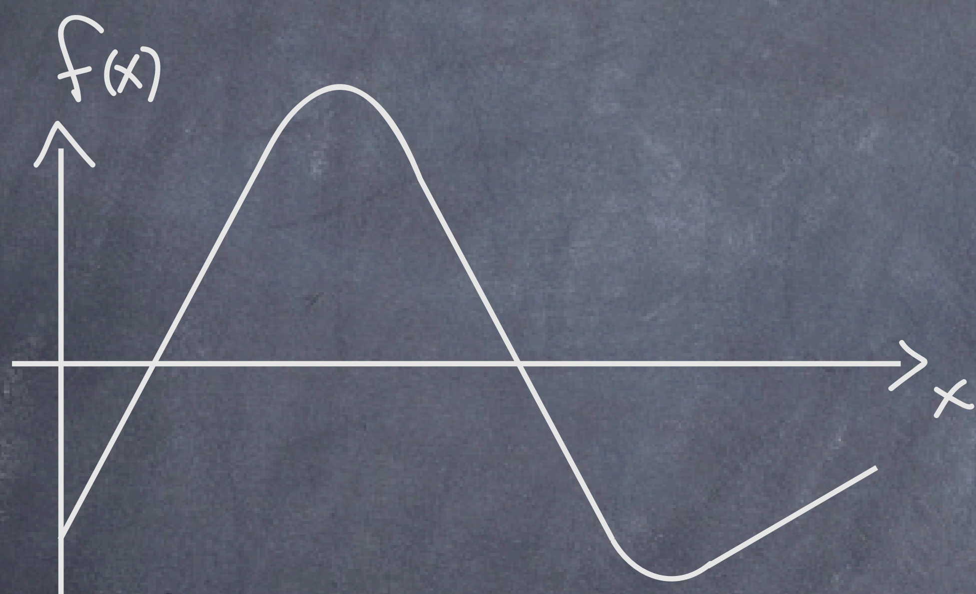

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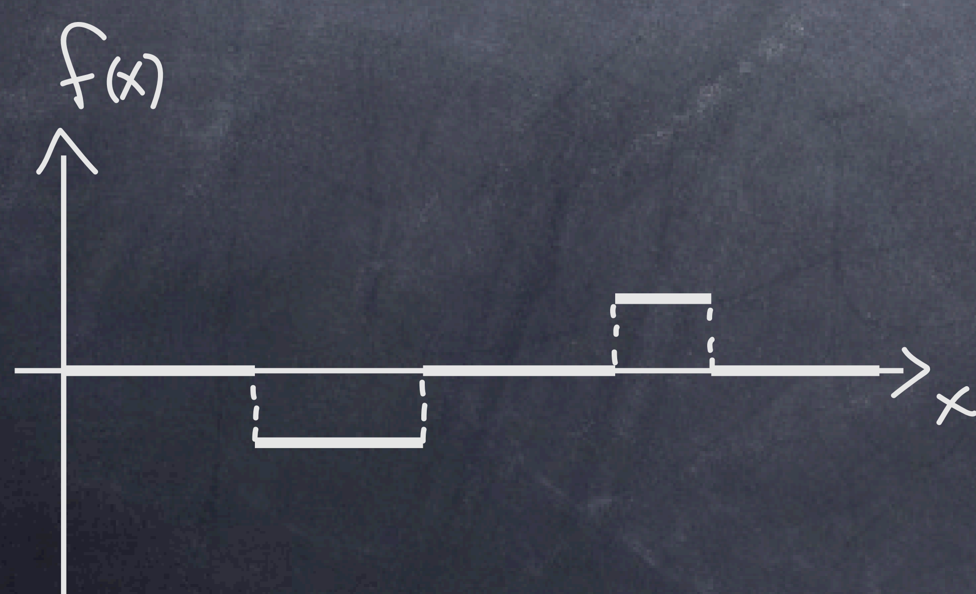
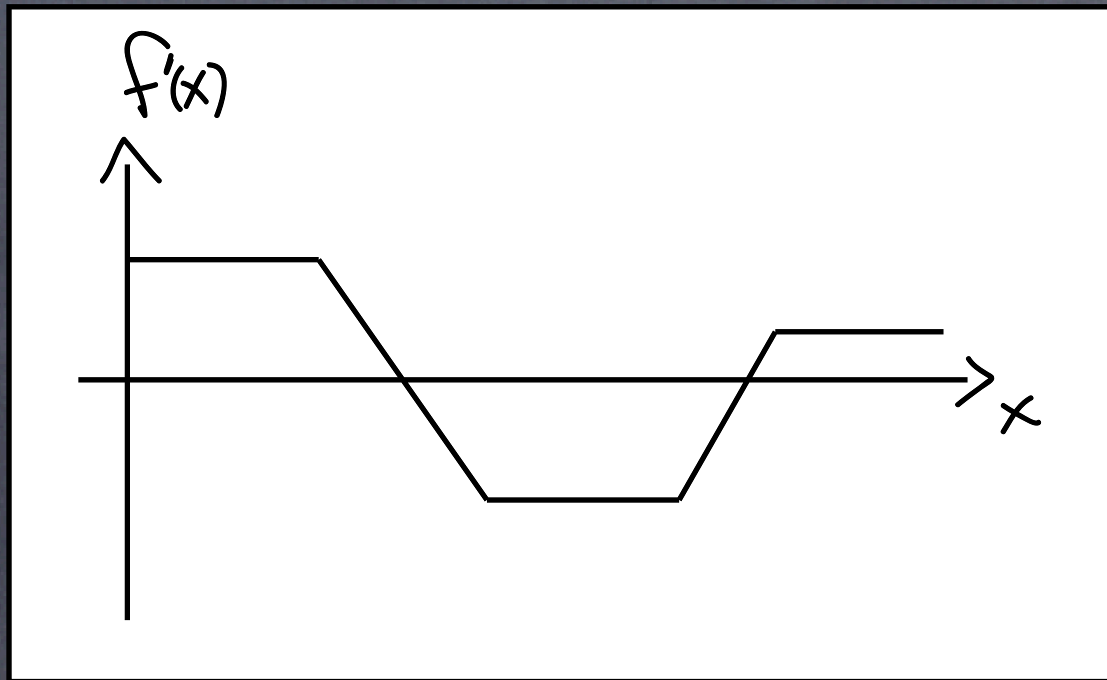
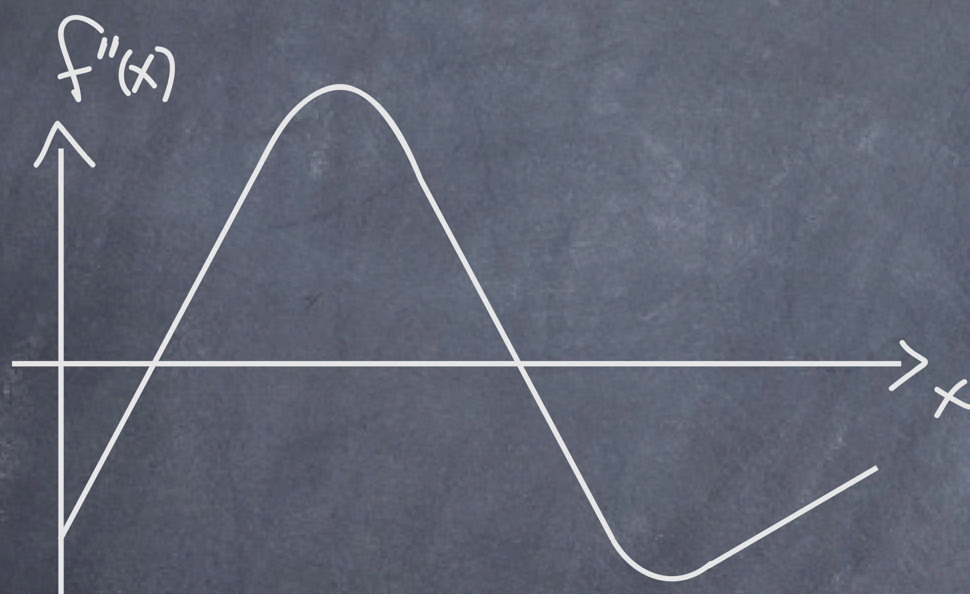




(A)



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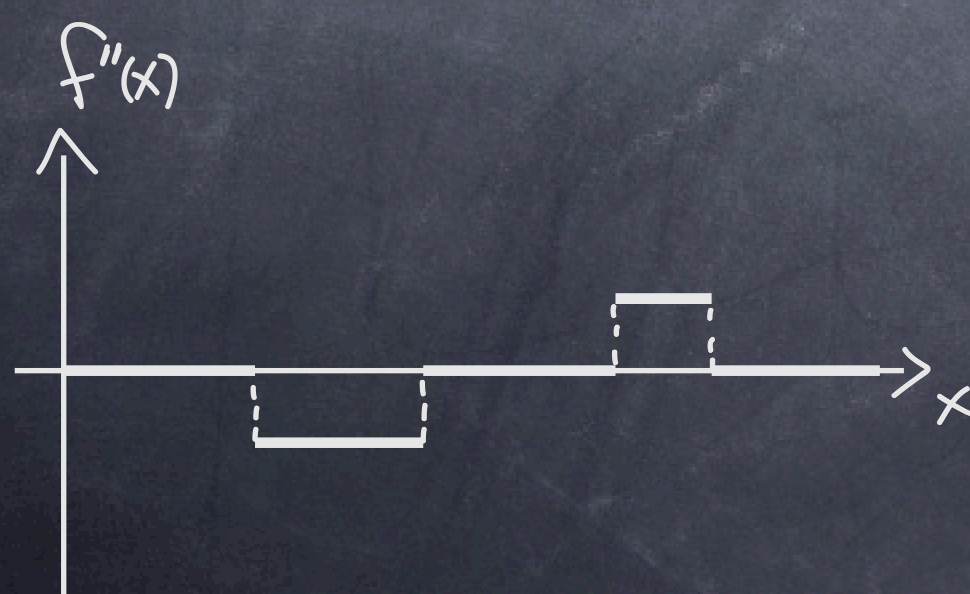

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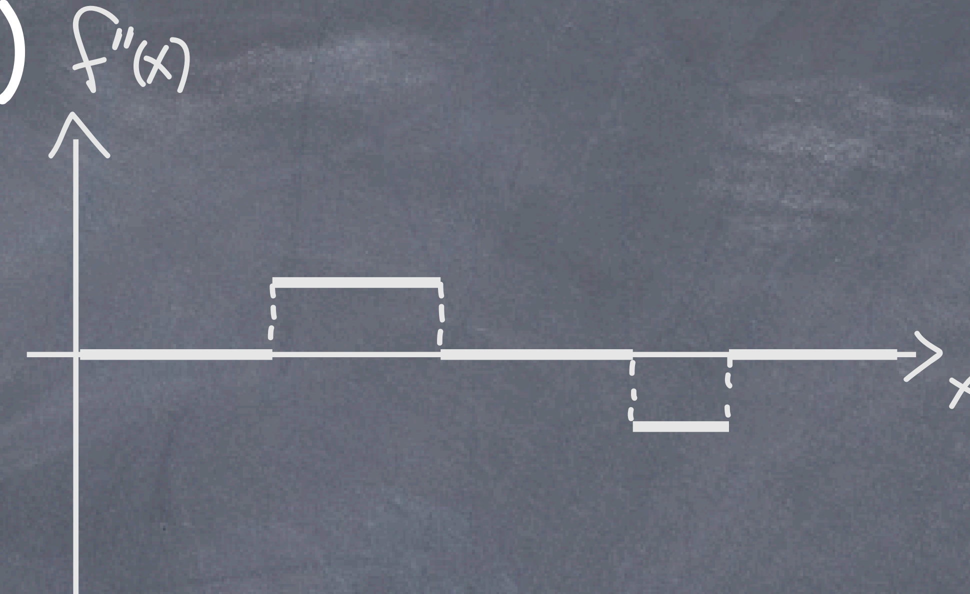

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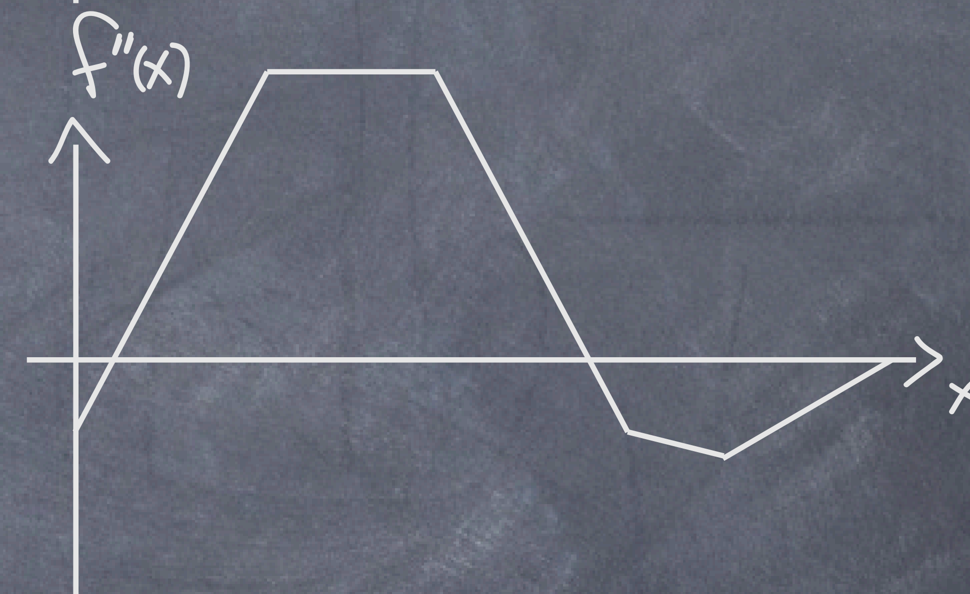

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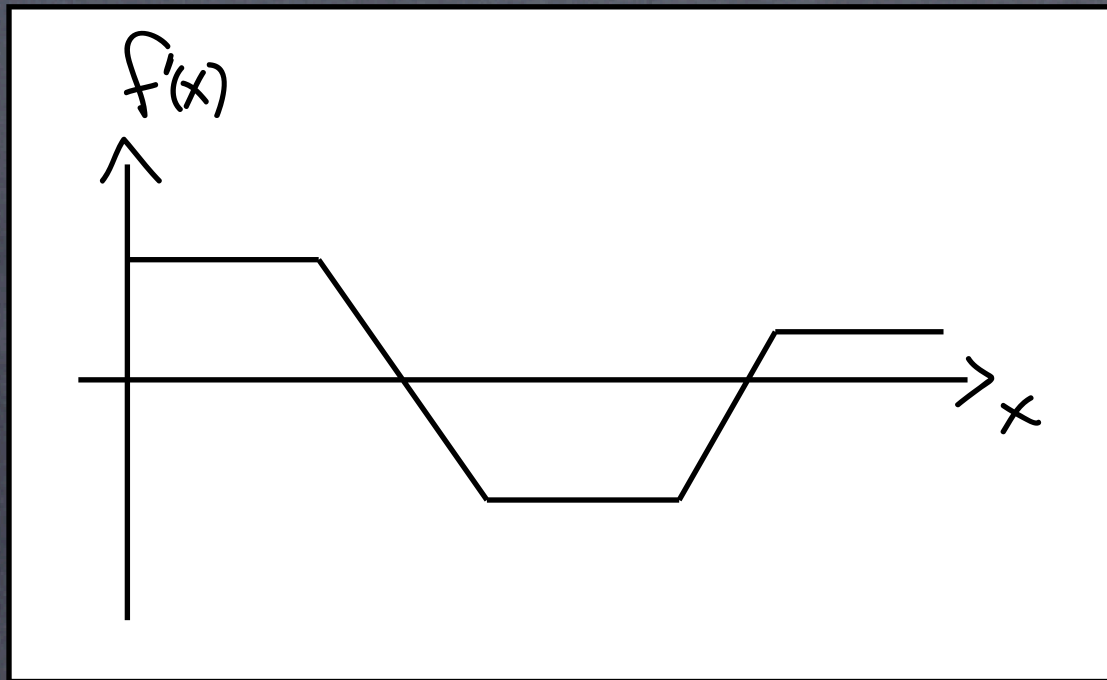
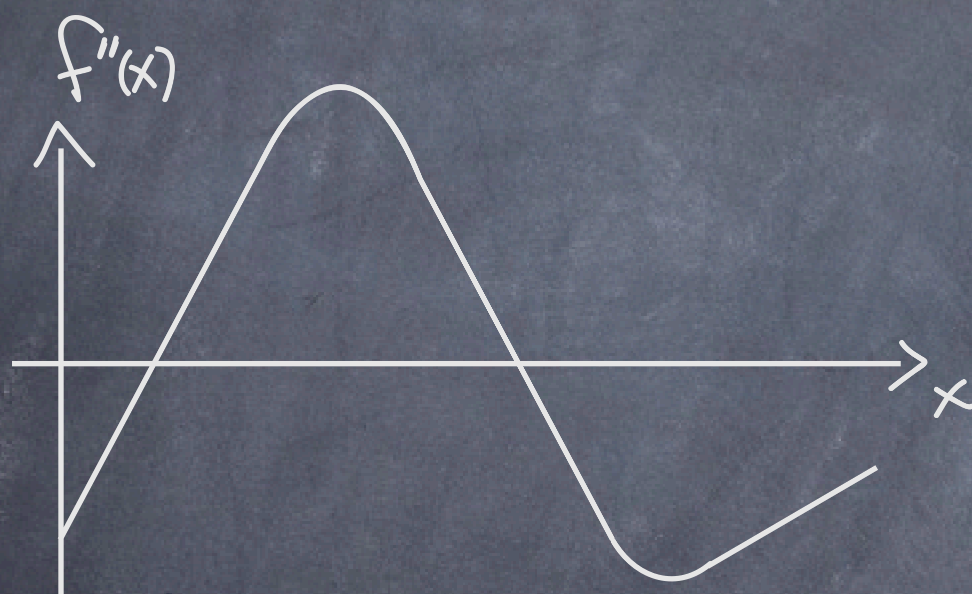


(A)



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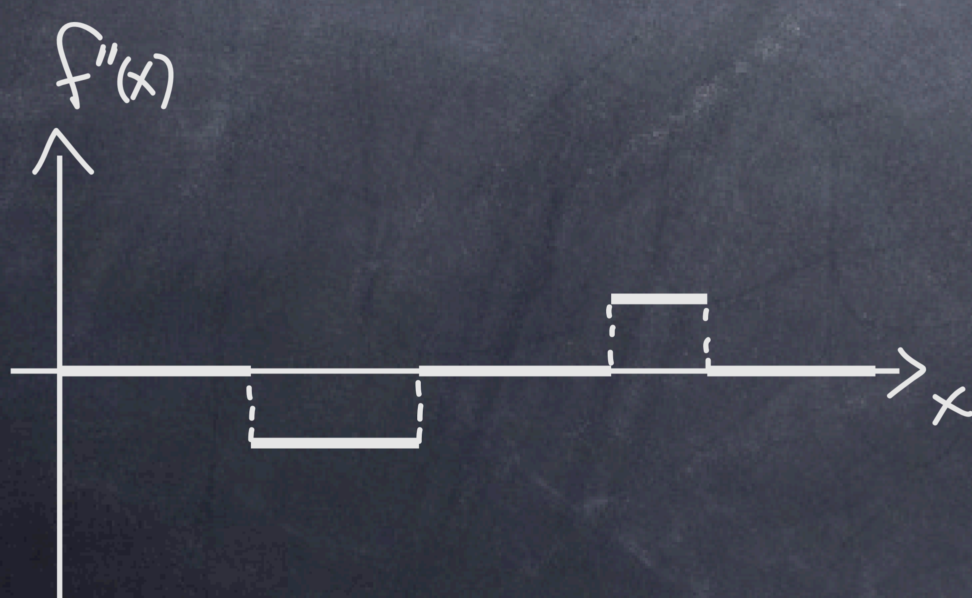

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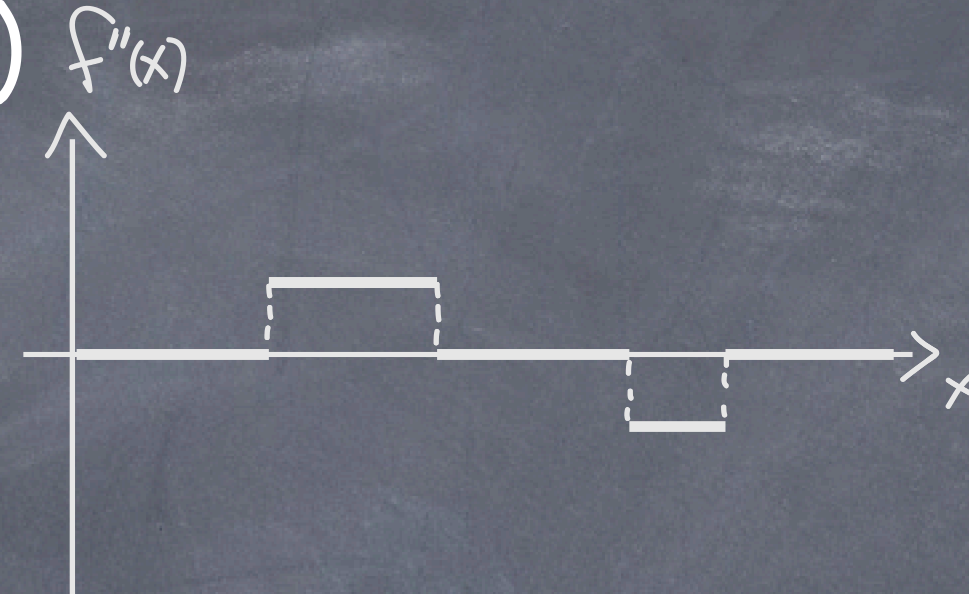

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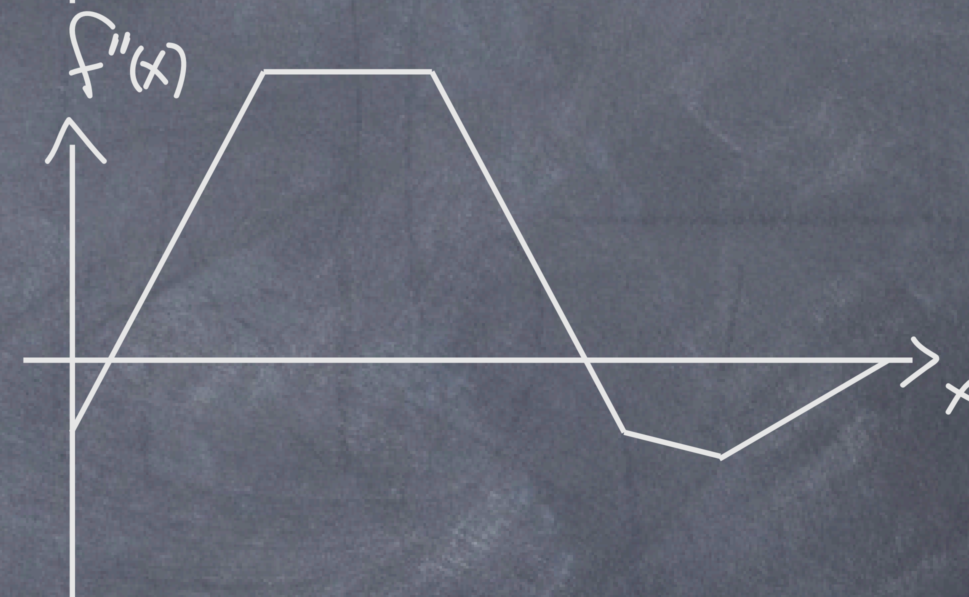


(E)

Position-Velocity-Acceleration

- If $x(t)$ is position as a function of time,
  - velocity $v(t) = x'(t)$,
  - acceleration $a(t) = v'(t) = x''(t)$.
- Constant acceleration a (surface of planet):
  - $v(t) = at + C = at + v_0$
  - $x(t) = a/2\ t^2 + v_0 t + D = a/2\ t^2 + v_0 t + x_0$

Examples of constant acceleration

- Ball dropping near surface of planet
- Fireworks
- Charged particle in electric field (gel electrophoresis)

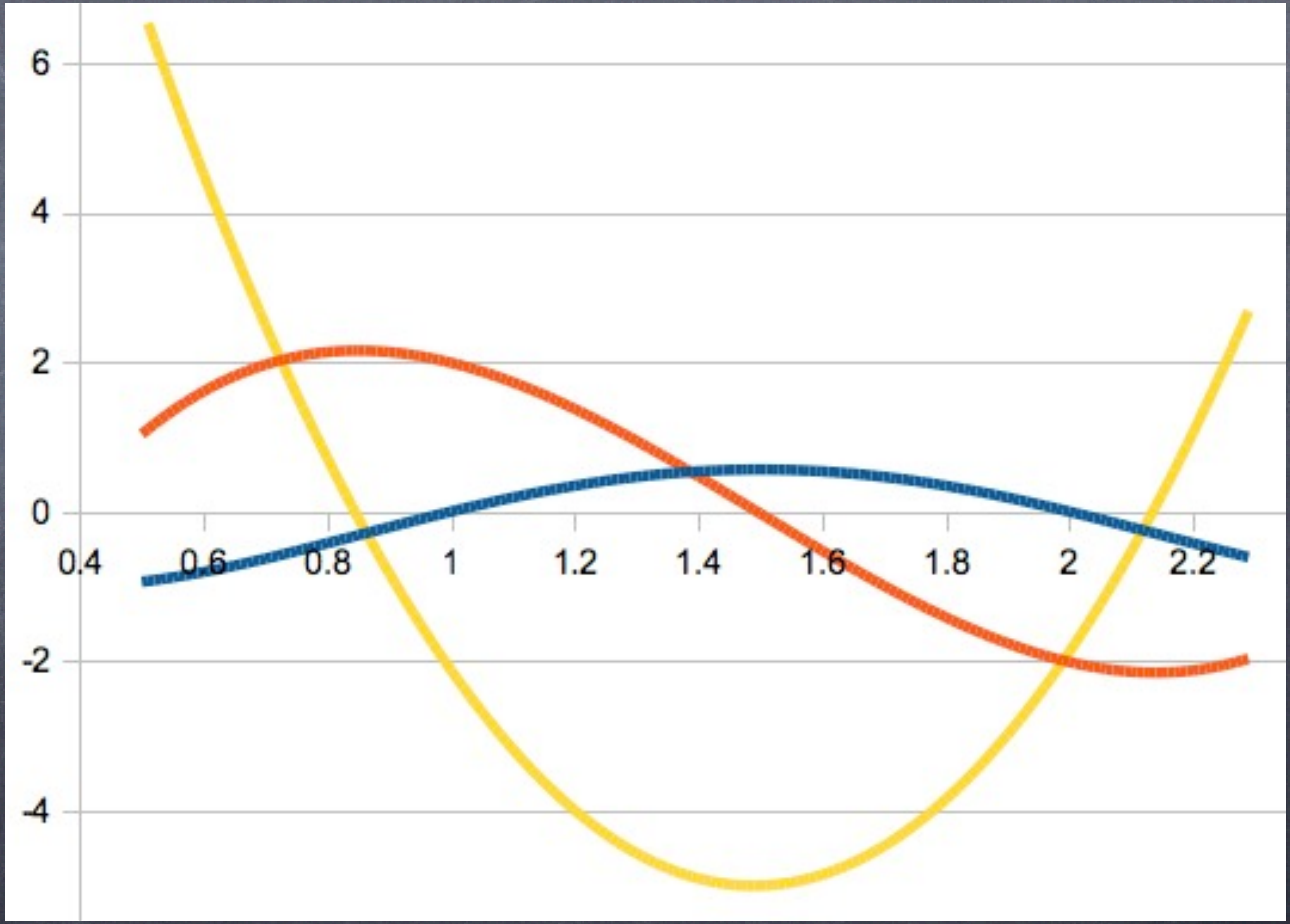
Which is x, v, a?

(A) x, v, a

(B) x, v, a

(C) x, v, a

(D) x, v, a



Check max/mins --> zeros, check inc/dec --> +/-.

Which is x, v, a?

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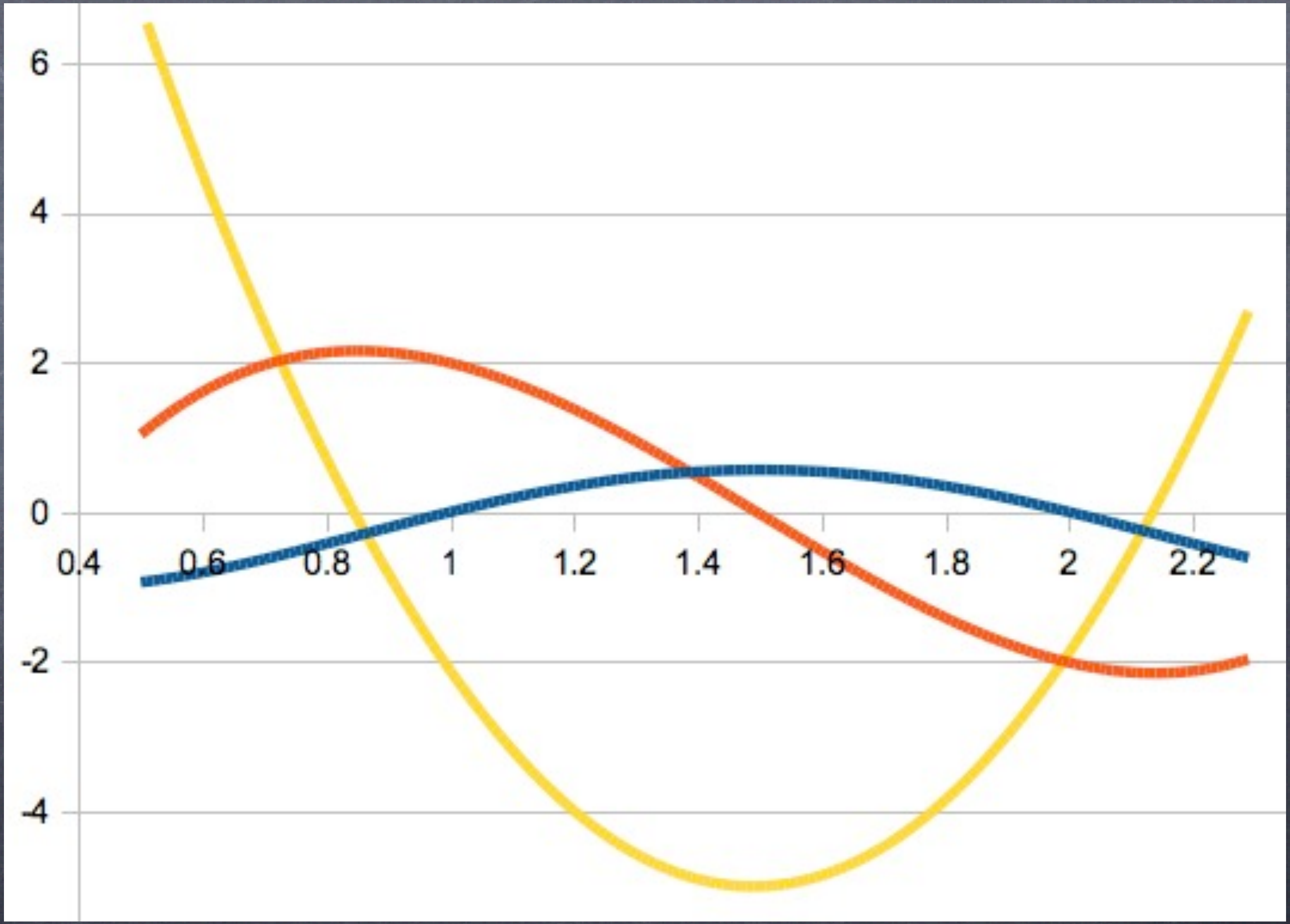

Check max/mins --> zeros, check inc/dec --> +/-.

Product rule: If $k(x)=f(x)g(x)$ then $k'(x) = ?$

- (A) $f'(x)g(x)$
- (B) $f(x)g'(x)$
- (C) $f'(x)g(x) + f(x)g'(x)$
- (D) $f'(x)g'(x)$

Example: k(x)=(x^5-2x^3+x^2+3)(3x^3-x^2+1)

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Quotient rule: If $k(x)=f(x)/g(x)$ then $k'(x) = ?$

- (A) $f'(x)/g'(x)$
- (B) $[\ f'(x)g(x) - f(x)g'(x)\ ] / g(x)^2$
- (C) $f'(x)g(x) + f(x)g'(x)$
- (D) $f'(x)/g(x)$

Example: $k(x)=2x^2/(3x+1)$

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Example: $k(x)=2x^2/(3x+1)$

What is k′(x) if $k(x) = \frac{2x^2}{3x+1}$?

(A) $k'(x) = \frac{4x}{3}$

(B) $k'(x) = \frac{4x}{3x+1} - \frac{2x^2}{3}$

(C) $k'(x) = \frac{6x^2+4x}{(3x+1)^2}$

(D) $k'(x) = \frac{4x}{3x+1} - \frac{2x^2}{(3x+1)^2}$

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