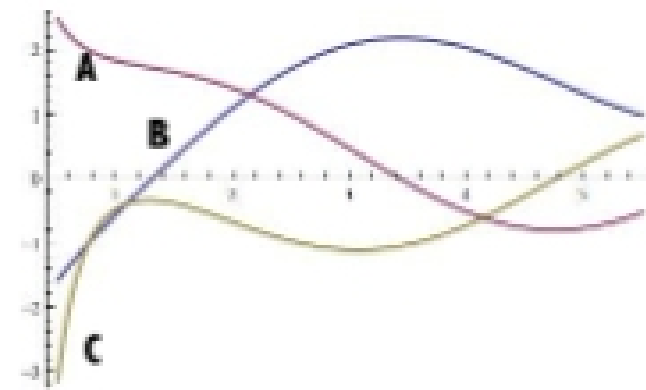
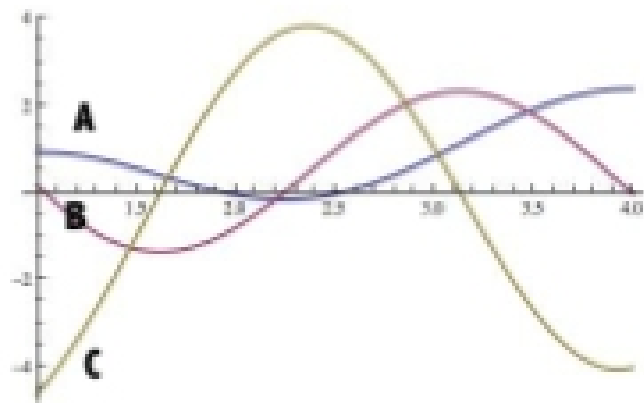


1. (6 points) Each of the following has the graph of a function, its derivative and its second derivative. Identify which one is which.



$$f(x) = \underline{\hspace{2cm}}$$

$$f'(x) = \underline{\hspace{2cm}}$$

$$f''(x) = \underline{\hspace{2cm}}$$

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$$f'(x) = \underline{\hspace{2cm}}$$

$$f''(x) = \underline{\hspace{2cm}}$$

2. (10 points)

Use the *definition* of the derivative to show

$$\text{if } f(x) = x^2 - x + 1 \quad \text{then} \quad f'(x) = 2x - 1$$

3. (18 points, 3/3/3/3/3/3)

Compute the following derivatives using any methods we have covered in class.

(a) $\frac{4x}{\sqrt[5]{x}} + \frac{e^x}{2}$

(b) $\ln x \sin x$

(c) $\frac{\tan x}{x^3 + 1}$

(d) $(8 - 5x^4)^8$

(e) $3^{5x + \cos x}$

(f) $\sqrt[3]{x + \sec x^2}$

4. (8 points)

Find an equation of the tangent line to the curve at the the given point.

$$y = 2x^5 - 3x^3 + 2, \quad (1, 1)$$

5. (10 points) Find the horizontal and vertical asymptotes of the curve.

(a) $y = \frac{-x^2 + 4x - 3}{x^2 - 6x + 5}$

(b) $y = \frac{2^x}{2^x - 5}$