

Activity Score = $\frac{1}{2}$

Repeated Differentiation of Sine and Cosine

- a) For which of the functions whose graphs are displayed by the Creating the Derivative mathlet is it true that $f''(x) = -f(x)$?
- b) Can you think of any other functions for which $f''(x) = -f(x)$?

✓ a.	$f(x)$	$f''(x) = -f(x)$
	$\sin x$	✓
	$\cos x$	✓
	$x - x^2$	✗
	$\ln(x)$	✗
	$e^{x/2}$	✗

Answer for b

$$f'(\cos x + \sin x) = -\sin x + \cos x$$

$$f''(\cos x + \sin x) = -\cos x - \sin x \\ = -(\cos x + \sin x)$$

b. Apparently, $f''(e^{-x}) = -e^{-x}$.

what we are trying to solve here is $f''(x) = -f(x)$

or $f'' - f = 0$.

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