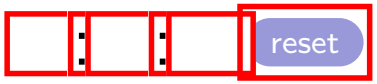
Bellwork 10/27

Find $\frac{\mathrm{d}y}{\mathrm{d}x}$ of the implicitly defined curve:

$$\sin(y) = x^2 + xy$$



Bellwork 10/27 - Solution

$$\sin(y) = x^2 + xy$$

$$\cos(y)\left(\frac{dy}{dx}\right) = 2x + y + x\left(\frac{dy}{dx}\right)$$

$$\left(\frac{dy}{dx}\right)[\cos(y) - x] = 2x + y$$

$$\boxed{\frac{dy}{dx} = \frac{2x + y}{\cos(y) - x}}$$

Exercise 1

Find $\frac{\mathrm{d}y}{\mathrm{d}x}$:

$$y = \ln(x - x^3)$$

Exercise 1 - Solution

$$\boxed{\frac{\mathrm{d}y}{\mathrm{d}x} = \frac{1 - 3x^2}{x - x^3}}$$

Exercise 2

Find $f'(x)$:

$$f(x) = x \ln\left[\sin^2\left(e^x\right)\right]$$

Exercise 2 - Solution

$$\boxed{f'(x) = 2e^x x \cot(e^x) + \ln[\sin^2(e^x)]}$$

Exercise 3

Find $g'(x)$:

$$g(x) = \frac{1}{\csc\left[x \ln\left(x\right)\right]}$$

Exercise 3 - Solution

$$\boxed{g'(x) = \ln(x)\cos[x\ln(x)] + \cos[x\ln(x)]}$$