Bellwork 10/23

Differentiate with respect to x:

1. $\sin(2x)$
2. e^{-x^2}
3. $3^{\cos(x^3)}$

Bellwork 10/23 - Solutions

1. $2\cos(2x)$
2. $-2e^{-x^2}x$
3. $-\ln(3)3^{\cos(x^3)+1}x^2\sin(x^3)$

Exercise 1

x	1	3
$f(x)$	$-\frac{\pi}{2}$	$\frac{\pi}{2}$
$f'(x)$	0	-1
$f''(x)$	3	2

$$g(x) = f(2x + 1)$$

Find $g'(0)$ and $g''(0)$.

Exercise 1 - Solutions

$$g'(x) = 2f'(2x+1) \implies \boxed{g'(0) = 2f'(1) = 0}$$

$$g''(x) = 4f''(2x+1) \implies \boxed{g''(0) = 4f''(1) = 0}$$

Exercise 2

x	1	3
$f(x)$	$-\frac{\pi}{2}$	$\frac{\pi}{2}$
$f'(x)$	0	-1
$f''(x)$	3	2

$$h(x) = \sin[f(x)]$$

Find $h'(3)$ and $h''(3)$.

Exercise 2 - Solutions

$$h'(x) = f'(x)\cos[f(x)] \implies \boxed{h'(3) = f'(3)\cos[f(3)] = 0}$$

$$h''(x) = f''(x)\cos[f(x)] - [f'(x)]^2 \sin[f(x)]$$

$$\implies \boxed{h''(3) = f''(3)\cos[f(3)] - [f'(3)]^2 \sin[f(3)] = -1}$$