Review of Differentiation

Basic Differentiation – Ex. 1

Differentiate $f(x) = x^3 - 2x^2 - 7$

Solution:

$$f'(x) = (3)(x^2) + (2)(-2x^1)$$

$$f'(x) = 3x^2 - 4x$$

Review of Differentiation

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Basic Differentiation – Ex. 2

Differentiate $y = -3x^4 + 2x^3 - 7$

Solution:

$$\frac{dy}{dx} = (4)(-3x^3) + (3)(2x^2)$$

$$\frac{dy}{dx} = -12x^3 + 6x^2$$

Review of Differentiation

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Basic Differentiation – Ex. 3

Differentiate $f(x) = \frac{1}{x^3} + \frac{1}{x}$

Solution: $f(x) = x^{-3} + x^{-1}$

$$f'(x) = (-3)(x^{-4}) + (-1)(x^{-2})$$

$$f'(x) = (-3)\left(\frac{1}{x^4}\right) + (-1)\left(\frac{1}{x^2}\right)$$

Review of Differentiation

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Basic Differentiation – Ex. 3

$$f'(x) = (-3)\left(\frac{1}{x^4}\right) + (-1)\left(\frac{1}{x^2}\right)$$

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

Review of Differentiation

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Basic Differentiation – Trig. & Exponential Examples

(a) $y = 4 \sin x$

$$\frac{dy}{dx} = 4 \cos x$$

(b) $y = 3 \cos 4x$

$$\frac{dy}{dx} = 3(-\sin 4x)(4)$$

$$\frac{dy}{dx} = -12 \sin 4x$$

(c) $y = -4 \sin x^2$

$$\frac{dy}{dx} = -4\,(\cos x^2)(2x)$$

$$\frac{dy}{dx} = -8x \cos x^2$$

(d) $y = 3e^{4x}$

$$\frac{dy}{dx} = 12e^{4x}$$

Review of Differentiation

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