

Wolfram|Alpha Input: `derivate 3x^4 - 8x^3 - 48x^2`

#### STEP 1

Possible derivation:

$$\frac{d}{dx}(-48x^2 - 8x^3 + 3x^4)$$

#### STEP 2

Differentiate the sum term by term and factor out constants:

$$= -48 \left( \frac{d}{dx}(x^2) \right) - 8 \left( \frac{d}{dx}(x^3) \right) + 3 \left( \frac{d}{dx}(x^4) \right)$$

#### STEP 3

Use the power rule,  $\frac{d}{dx}(x^n) = n x^{n-1}$ , where  $n = 2$ .

$$\frac{d}{dx}(x^2) = 2x:$$

$$= -8 \left( \frac{d}{dx}(x^3) \right) + 3 \left( \frac{d}{dx}(x^4) \right) - 48 \boxed{2x}$$

#### STEP 4

Simplify the expression:

$$= -96x - 8 \left( \frac{d}{dx}(x^3) \right) + 3 \left( \frac{d}{dx}(x^4) \right)$$

#### STEP 5

Use the power rule,  $\frac{d}{dx}(x^n) = n x^{n-1}$ , where  $n = 3$ .

$$\frac{d}{dx}(x^3) = 3x^2:$$

$$= -96x + 3 \left( \frac{d}{dx}(x^4) \right) - 8 \boxed{3x^2}$$

#### STEP 6

Simplify the expression:

$$= -96x - 24x^2 + 3 \left( \frac{d}{dx}(x^4) \right)$$

#### STEP 7

Use the power rule,  $\frac{d}{dx}(x^n) = n x^{n-1}$ , where  $n = 4$ .

$$\frac{d}{dx}(x^4) = 4x^3:$$

$$= -96x - 24x^2 + 3 \boxed{4x^3}$$

#### STEP 8

Simplify the expression:

$$= -96x - 24x^2 + 12x^3$$

## STEP 9

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Simplify the expression:

Answer:

$$= 12x(-8 - 2x + x^2)$$



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