Differentiating powers and polynomials

6 questions | 18 marks

Equivalent correct methods earn the corresponding marks.

1. Differentiate $3x^4 - 2x^2 + 5$. [3 marks]

Differentiate each power; the constant 5 contributes 0.

Answer: $12x^3 - 4x$

2. Find d/dt of $6t^3 + t - 8$. [3 marks]

$6(3)t^2 + 1 - 0 = 18t^2 + 1$.

Answer: $18t^2 + 1$

3. Differentiate $y = 9 - 4x$. [3 marks]

The derivative of 9 is 0; that of $-4x$ is -4.

Answer: -4

4. Differentiate $(x + 2)(x - 3)$. [3 marks]

Expand to $x^2 - x - 6$, then differentiate.

Answer: $2x - 1$

5. Differentiate $f(x) = \frac{1}{2}x^4 - 3x^2 + 6x$. [3 marks]

$\frac{1}{2}(4)x^3 - 3(2)x + 6 = 2x^3 - 6x + 6$.

Answer: $2x^3 - 6x + 6$

6. A student differentiates $8x^3$ as $8x^2$. Correct and explain. [3 marks]

Multiply the coefficient by 3 while reducing the exponent to 2.

Answer: $24x^2$