THE DERIVATIVE AS LIMIT OF RATE OF CHANGE

NUTM Nexus Writing Team

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1 ClassWork I

Find the derivative, $\frac{dy}{dx}$ or $f'(x)$, for the following functions:

1. $y = f(x) = x^4 - 3x^2 + 8x + 6$
2. $y = f(x) = 4x^2 - 5x$
3. $y = f(x) = x^2 - 4x + 10$
4. $y = f(x) = x^2 + 6x + 5$
5. $y = f(x) = x^2 - 2x - 3$
6. $y = f(x) = 4x^2 + 3x + 5$
7. $y = f(x) = x^2 - 4x + 3$
8. $y = f(x) = 2x^2 - 8x + 4$
9. $y = f(x) = 3x^2 - 6x + 5$
10. $y = f(x) = 4x^3 - 30x^2 + 74x - 60$
11. $y = f(x) = 2x^2 + 7x - 5$
12. $y = f(x) = x^3 - 6x^2$
13. $y = f(x) = 3x^2 - 12$
14. $y = f(x) = x^2 - 3x + 4$
15. $y = f(x) = x^2 - 4x + 5$

2 ClassWork II

Find the derivative, $\frac{dy}{dx}$ or $f'(x)$, for the following functions:

16. $y = f(x) = x^2 + 4x - 1$

17. $y = f(x) = x^3 + 3x^2 + 1$
18. $y = f(x) = x^2 + 2$
19. $y = f(x) = 3x^2 + 6x$
20. $y = f(x) = 5x^4 + 12x^3 + 6x^2 + 14x$
21. $y = f(x) = 1 - 2x - x^2$
22. $y = f(x) = (x^2 + 1)^2$
23. $y = f(x) = x^6 + 4x^3 + 5$
24. $y = f(x) = (x^2 - 4)^2$
25. $y = f(x) = 6x^5 + 12x^2$
26. $y = f(x) = x^3 + 3x$
27. $y = f(x) = -x^3 + 3x^2 + 9x + 5$
28. $y = f(x) = 2x^3 - 24x + 5$
29. $y = f(x) = (x - 1)^3(x - 2)$
30. $y = f(x) = 6(x + 2)(x - 2)$

3 Assignment I

Find the derivative of the given function with respect to its independent variable:

31. $t = f(u) = 6u^{3/2}$
32. $w = f(p) = (p^2 + 4)^{1/2}$
33. $b = f(v) = -5 + 3v - \frac{3}{2}v^2 - 7v^3$
34. $a = f(c) = \frac{2}{c^2 - 1}$
35. $y = f(x) = 17x^2 - 10x + 15$