Rješenja zadataka 4.3

Zadatak 1. Izračunaj derivacije sljedećih funkcija:

1) $f(x) = (x-1)^2$;
2) $f(x) = (x+1)^3$;
3) $f(x) = (x^2+1)^2$;
4) $f(x) = (2x-1)^3$;
5) $f(x) = (1-x^2)^3$;
6) $f(x) = (1-x)^3$;
7) $f(x) = (1-2x^2)^2$;
8) $f(x) = (5x^2-3x+1)^2$;
9) $f(x) = (x^3-4x)^3$;
10) $f(x) = (4x+1)^3 - (x^2-1)^2$.

Rješenje.

1) $f'(x) = [(x-1)^2]' = 2\cdot(x-1)^{2-1}\cdot(x-1)' = 2(x-1)$;
2) $f'(x) = [(x+1)^3]' = 3\cdot(x+1)^{3-1}\cdot(x+1)' = 3(x+1)^2$;
3) $f'(x) = [(x^2+1)^2]' = 2\cdot(x^2+1)^{2-1}\cdot(x^2+1)' == 2(x^2+1)\cdot 2x = 4x(x^2+1)$;
4) $f'(x) = [(2x-1)^3]' = 3\cdot(2x-1)^{3-1}\cdot(2x-1)' = 3(2x-1)^2\cdot 2 = 6(2x-1)^2$;
5) $f'(x) = [(1-x^2)^3]' = 3\cdot(1-x^2)^{3-1}\cdot(1-x^2)' = 3(1-x^2)^2\cdot(-2x) = -6x(1-x^2)^2$;
6) $f'(x) = [(1-x)^3]' = 3\cdot(1-x)^{3-1}\cdot(1-x)' = -3(1-x)^2$;
7) $f'(x) = [(1-2x^2)^2]' = 2\cdot(1-2x^2)^{2-1}\cdot(1-2x^2)' = 2(1-2x^2)\cdot(-4x) = -8x(1-2x^2)$;
8) $'f(x) = [(5x^2-3x+1)^2]' = 2\cdot(5x^2-3x+1)^{2-1}\cdot(5x^2-3x+1)' = 2(5x^2-3x+1)(10x-3) = 2(10x-3)(5x^2-3x+1)$;
9) $f'(x) = [(x^3-4x)^3]' = 3\cdot(x^3-4x)^{3-1}\cdot(x^3-4x)' = 3(x^3-4x)^2(3x^2-4)$;
10) $f'(x) = [(4x+1)^3 - (x^2-1)^2]' = [(4x+1)^3]' - [(x^2-1)^2]' = 3\cdot(4x+1)^{3-1}\cdot(4x+1)' - 2\cdot(x^2-1)^{2-1}\cdot(x^2-1)' = 3(4x+1)^2\cdot 4 - 2(x^2-1)\cdot 2x = 12(4x+1)^2 - 4x(x^2-1)$.