Calculus

Differentiate each function with respect to the given variable.

1) $h = \left(t^4 - 3\right)\sqrt[5]{t+3}$

2) $t = \sqrt[3]{\dfrac{2x^3 + 5}{-3x^5 + 2}}$

3) $f = \dfrac{\sqrt[5]{x^3 - 4}}{3x^5 + 2}$

4) $y = \dfrac{\left(-5t^5 - 3\right)^{\frac{1}{3}}}{\sqrt[5]{5t^2 + 1}}$

5) $h = \dfrac{\left(4t^4 + 5\right)^{\frac{1}{3}}}{3t - 2}$

For each problem, use implicit differentiation to find $\dfrac{dy}{dx}$ in terms of x and y.

6) $2 = x^2 + 3x^2y^3 + x^3y$

7) $-xy^3 + 2 = 2x^2 + xy$

8) $1 = 2x^3 + 3x^3y + xy$

9) $-4y^2 - 5x^3y^2 + 3 = 3x^2$

10) $2x^3 + 4y + 4x^3y^2 = 4$

Differentiate each function with respect to *x*.

11) $y = \sin^{-1}\left(x^5 - 5\right)^4$

12) $y = \left(\tan^{-1} 3x^3\right)^2$

13) $y = \left(\tan^{-1} 5x^4\right)^4$

14) $y = \dfrac{\ln 4x^3}{\sqrt[3]{4x^5 - 5}}$

15) $y = \dfrac{e^{3x^5}}{\sin x^4}$

16) $y = e^{3x^4} \cdot (5x^5 - 3)^4$

17) $y = \ln 4x^2 \cdot \sec 4x^4$

18) $y = \dfrac{e^{4x^5}}{\sqrt[5]{5x^3 + 2}}$