Calculus Name_____

Practicing Derivative Rules (chain rule not included)

Differentiate each function with respect to *x*.

1) $y = 3\sqrt[5]{x}$

2) $y = \frac{1}{2}x + \frac{2}{5}\sqrt[5]{x}$

3) $y = -3x^3 + \frac{5}{2}x^2 - 2x$

4) $y = \frac{1}{2}\sqrt[3]{x^2} - 4\sqrt[3]{x} + 5\sqrt[4]{x}$

5) $y = \frac{4}{5}x^4 + \frac{1}{3}x^3 - 4\sqrt[5]{x}$

6) $y = (3x^4 + 3)(-4x^3 + 3)$

7) $y = (-3x^4 + 2x^3 - 4)(3x^3 + 1)$

8) $y = (3x^4 - 3)x^3$

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

10) $y = 4x^4(-5x^3 + 3)$

11) $y = 4x^3(x^2 + 5)$

12) $y = \frac{2}{4x^5 + 3}$

13) $f(x) = \frac{4x^2}{x^2 + 5}$

14) $y = \frac{x^5 + 4x^2}{3x^4 + 2}$

15) $f(x) = \frac{3}{3x^3 - 2}$

16) $y = \frac{2x^4}{2x^2 - 5}$

17) $f(x) = \frac{3x^4 + 3x^3 + 5}{3x^5 + 2}$

For each problem, find the indicated derivative with respect to *x*.

18) $y = 5x^3 + 3x^2 + 3x$ Find $\frac{d^2y}{dx^2}$

19) $y = 3x^4$ Find $\frac{d^2y}{dx^2}$

20) $f(x) = 4x^5 + x^4 - x^3$ Find f''