Name_____

Calculus Practice: Calculating Derivatives 2b

Differentiate each function with respect to x.

1) $f(x) = -\dfrac{1}{x^4}$

2) $f(x) = \dfrac{5}{x} + \dfrac{1}{2x^2}$

3) $y = \dfrac{2}{x^3}$

4) $y = \dfrac{1}{x} - \dfrac{3}{2x^2}$

5) $y = -\dfrac{4}{3x^2}$

6) $y = \dfrac{4}{x}$

7) $y = \dfrac{3}{x^2} + \dfrac{4}{x^5}$

8) $f(x) = -\dfrac{1}{3x^3} - \dfrac{4}{x^5}$

9) $f(x) = \dfrac{3}{4x^5}$

10) $f(x) = \dfrac{3}{x^4}$

11) $y = -\dfrac{5}{x^2}$

12) $f(x) = \dfrac{5}{x} - \dfrac{1}{3x^3}$

13) $y = -\dfrac{1}{x} - \dfrac{4}{5x^4}$

14) $y = -\dfrac{3}{5x^5}$

15) $f(x) = \dfrac{1}{2x} + \dfrac{2}{x^3}$

16) $f(x) = \dfrac{3}{2x} - \dfrac{4}{x^3} - \dfrac{3}{5x^5}$

17) $f(x) = \dfrac{1}{x} + \dfrac{1}{2x^2} + \dfrac{2}{x^5}$

18) $y = \dfrac{5}{2x} - \dfrac{3}{4x^3} + \dfrac{4}{x^4}$

19) $y = -\dfrac{5}{x} + \dfrac{5}{x^4}$

20) $f(x) = \dfrac{4}{5x^3}$

Name_____

Calculus Practice: Calculating Derivatives 2b

Differentiate each function with respect to x.

1) $f(x) = -\dfrac{1}{x^4}$

$$f'(x) = 4x^{-5}$$
$$= \dfrac{4}{x^5}$$

2) $f(x) = \dfrac{5}{x} + \dfrac{1}{2x^2}$

$$f'(x) = -5x^{-2} - x^{-3}$$
$$= -\dfrac{5}{x^2} - \dfrac{1}{x^3}$$

3) $y = \dfrac{2}{x^3}$

$$\dfrac{dy}{dx} = -6x^{-4}$$
$$= -\dfrac{6}{x^4}$$

4) $y = \dfrac{1}{x} - \dfrac{3}{2x^2}$

$$\dfrac{dy}{dx} = -x^{-2} + 3x^{-3}$$
$$= -\dfrac{1}{x^2} + \dfrac{3}{x^3}$$

5) $y = -\dfrac{4}{3x^2}$

$$\dfrac{dy}{dx} = \dfrac{8x^{-3}}{3}$$
$$= \dfrac{8}{3x^3}$$

6) $y = \dfrac{4}{x}$

$$\dfrac{dy}{dx} = -4x^{-2}$$
$$= -\dfrac{4}{x^2}$$

7) $y = \dfrac{3}{x^2} + \dfrac{4}{x^5}$

$$\dfrac{dy}{dx} = -6x^{-3} - 20x^{-6}$$
$$= -\dfrac{6}{x^3} - \dfrac{20}{x^6}$$

8) $f(x) = -\dfrac{1}{3x^3} - \dfrac{4}{x^5}$

$$f'(x) = \dfrac{3x^{-4}}{3} + 20x^{-6}$$
$$= \dfrac{1}{x^4} + \dfrac{20}{x^6}$$

9) $f(x) = \dfrac{3}{4x^5}$

$$f'(x) = -\dfrac{15x^{-6}}{4}$$
$$= -\dfrac{15}{4x^6}$$

10) $f(x) = \dfrac{3}{x^4}$

$$f'(x) = -12x^{-5}$$
$$= -\dfrac{12}{x^5}$$

11) $y = -\dfrac{5}{x^2}$

$\dfrac{dy}{dx} = 10x^{-3}$

$= \dfrac{10}{x^3}$

12) $f(x) = \dfrac{5}{x} - \dfrac{1}{3x^3}$

$f'(x) = -5x^{-2} + \dfrac{3x^{-4}}{3}$

$= -\dfrac{5}{x^2} + \dfrac{1}{x^4}$

13) $y = -\dfrac{1}{x} - \dfrac{4}{5x^4}$

$\dfrac{dy}{dx} = x^{-2} + \dfrac{16x^{-5}}{5}$

$= \dfrac{1}{x^2} + \dfrac{16}{5x^5}$

14) $y = -\dfrac{3}{5x^5}$

$\dfrac{dy}{dx} = 3x^{-6}$

$= \dfrac{3}{x^6}$

15) $f(x) = \dfrac{1}{2x} + \dfrac{2}{x^3}$

$f'(x) = -\dfrac{x^{-2}}{2} - 6x^{-4}$

$= -\dfrac{1}{2x^2} - \dfrac{6}{x^4}$

16) $f(x) = \dfrac{3}{2x} - \dfrac{4}{x^3} - \dfrac{3}{5x^5}$

$f'(x) = -\dfrac{3x^{-2}}{2} + 12x^{-4} + 3x^{-6}$

$= -\dfrac{3}{2x^2} + \dfrac{12}{x^4} + \dfrac{3}{x^6}$

17) $f(x) = \dfrac{1}{x} + \dfrac{1}{2x^2} + \dfrac{2}{x^5}$

$f'(x) = -x^{-2} - x^{-3} - 10x^{-6}$

$= -\dfrac{1}{x^2} - \dfrac{1}{x^3} - \dfrac{10}{x^6}$

18) $y = \dfrac{5}{2x} - \dfrac{3}{4x^3} + \dfrac{4}{x^4}$

$\dfrac{dy}{dx} = -\dfrac{5x^{-2}}{2} + \dfrac{9x^{-4}}{4} - 16x^{-5}$

$= -\dfrac{5}{2x^2} + \dfrac{9}{4x^4} - \dfrac{16}{x^5}$

19) $y = -\dfrac{5}{x} + \dfrac{5}{x^4}$

$\dfrac{dy}{dx} = 5x^{-2} - 20x^{-5}$

$= \dfrac{5}{x^2} - \dfrac{20}{x^5}$

20) $f(x) = \dfrac{4}{5x^3}$

$f'(x) = -\dfrac{12x^{-4}}{5}$

$= -\dfrac{12}{5x^4}$