Name_____

Calculus Practice: Calculating Derivatives 2a

Differentiate each function with respect to x.

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

   A) $f'(x) = -5x^{-2} + 3x^{-5} + 3x^{-6}$
$$= -\frac{5}{x^2} + \frac{3}{x^5} + \frac{3}{x^6}$$

   B) $f'(x) = 5x^{-1} - 12x^{-4} - 15x^{-5}$
$$= \frac{5}{x} - \frac{12}{x^4} - \frac{15}{x^5}$$

   C) $f'(x) = 5x^{-2} - 12x^{-5} - 15x^{-6}$
$$= \frac{5}{x^2} - \frac{12}{x^5} - \frac{15}{x^6}$$

   D) $f'(x) = 5x - 12x - 15x$
$$= -22x$$

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

   A) $f'(x) = -15x^{-4} + \dfrac{16x^{-5}}{3} - 10x^{-6}$
$$= -\frac{15}{x^4} + \frac{16}{3x^5} - \frac{10}{x^6}$$

   B) $f'(x) = 5x^{-4} - \dfrac{4x^{-5}}{3} + 2x^{-6}$
$$= \frac{5}{x^4} - \frac{4}{3x^5} + \frac{2}{x^6}$$

   C) $f'(x) = -15x + \dfrac{16x}{3} - 10x$
$$= -25x + \frac{16x}{3}$$

   D) $f'(x) = -15x^{-3} + \dfrac{16x^{-4}}{3} - 10x^{-5}$
$$= -\frac{15}{x^3} + \frac{16}{3x^4} - \frac{10}{x^5}$$

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

   A) $\dfrac{dy}{dx} = -\dfrac{6x}{5} + 12x - 25x$
$$= -\frac{6x}{5} - 13x$$

   B) $\dfrac{dy}{dx} = -\dfrac{6x^{-3}}{5} + 12x^{-4} - 25x^{-5}$
$$= -\frac{6}{5x^3} + \frac{12}{x^4} - \frac{25}{x^5}$$

   C) $\dfrac{dy}{dx} = \dfrac{2x^{-4}}{5} - 3x^{-5} + 5x^{-6}$
$$= \frac{2}{5x^4} - \frac{3}{x^5} + \frac{5}{x^6}$$

   D) $\dfrac{dy}{dx} = -\dfrac{6x^{-4}}{5} + 12x^{-5} - 25x^{-6}$
$$= -\frac{6}{5x^4} + \frac{12}{x^5} - \frac{25}{x^6}$$

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

   A) $\dfrac{dy}{dx} = 8x^{-3} + \dfrac{12x^{-5}}{5}$
$$= \frac{8}{x^3} + \frac{12}{5x^5}$$

   B) $\dfrac{dy}{dx} = -4x^{-3} - \dfrac{3x^{-5}}{5}$
$$= -\frac{4}{x^3} - \frac{3}{5x^5}$$

   C) $\dfrac{dy}{dx} = 8x^{-2} + \dfrac{12x^{-4}}{5}$
$$= \frac{8}{x^2} + \frac{12}{5x^4}$$

   D) $\dfrac{dy}{dx} = 8x + \dfrac{12x}{5}$

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

  A) $f'(x) = -\dfrac{4x}{3} - 20x - 20x$

       $= -\dfrac{4x}{3} - 40x$

  B) $f'(x) = \dfrac{4x^{-2}}{3} + 5x^{-5} + 4x^{-6}$

       $= \dfrac{4}{3x^2} + \dfrac{5}{x^5} + \dfrac{4}{x^6}$

  C) $f'(x) = -\dfrac{4x^{-2}}{3} - 20x^{-5} - 20x^{-6}$

       $= -\dfrac{4}{3x^2} - \dfrac{20}{x^5} - \dfrac{20}{x^6}$

  D) $f'(x) = -\dfrac{4x^{-1}}{3} - 20x^{-4} - 20x^{-5}$

       $= -\dfrac{4}{3x} - \dfrac{20}{x^4} - \dfrac{20}{x^5}$

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

  A) $\dfrac{dy}{dx} = 4x^{-5}$

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

  B) $\dfrac{dy}{dx} = -16x$

  C) $\dfrac{dy}{dx} = -16x^{-4}$

       $= -\dfrac{16}{x^4}$

  D) $\dfrac{dy}{dx} = -16x^{-5}$

       $= -\dfrac{16}{x^5}$

7) $y = \dfrac{1}{x} + \dfrac{1}{2x^5}$

  A) $\dfrac{dy}{dx} = -x - \dfrac{5x}{2}$

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

  B) $\dfrac{dy}{dx} = x^{-2} + \dfrac{x^{-6}}{2}$

       $= \dfrac{1}{x^2} + \dfrac{1}{2x^6}$

  C) $\dfrac{dy}{dx} = -x^{-2} - \dfrac{5x^{-6}}{2}$

       $= -\dfrac{1}{x^2} - \dfrac{5}{2x^6}$

  D) $\dfrac{dy}{dx} = -x^{-1} - \dfrac{5x^{-5}}{2}$

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

8) $y = -\dfrac{1}{4x^2} - \dfrac{2}{5x^4}$

  A) $\dfrac{dy}{dx} = \dfrac{2x}{4} + \dfrac{8x}{5}$

  B) $\dfrac{dy}{dx} = \dfrac{2x^{-3}}{4} + \dfrac{8x^{-5}}{5}$

       $= \dfrac{2}{4x^3} + \dfrac{8}{5x^5}$

  C) $\dfrac{dy}{dx} = \dfrac{2x^{-2}}{4} + \dfrac{8x^{-4}}{5}$

       $= \dfrac{2}{4x^2} + \dfrac{8}{5x^4}$

  D) $\dfrac{dy}{dx} = -\dfrac{x^{-3}}{4} - \dfrac{2x^{-5}}{5}$

       $= -\dfrac{1}{4x^3} - \dfrac{2}{5x^5}$

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Calculus Practice: Calculating Derivatives 2a

Differentiate each function with respect to *x*.

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  *C) $f'(x) = -\dfrac{4x^{-2}}{3} - 20x^{-5} - 20x^{-6}$

      $= -\dfrac{4}{3x^2} - \dfrac{20}{x^5} - \dfrac{20}{x^6}$

  D) $f'(x) = -\dfrac{4x^{-1}}{3} - 20x^{-4} - 20x^{-5}$

      $= -\dfrac{4}{3x} - \dfrac{20}{x^4} - \dfrac{20}{x^5}$

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      $= \dfrac{2}{4x^3} + \dfrac{8}{5x^5}$

  C) $\dfrac{dy}{dx} = \dfrac{2x^{-2}}{4} + \dfrac{8x^{-4}}{5}$

      $= \dfrac{2}{4x^2} + \dfrac{8}{5x^4}$

  D) $\dfrac{dy}{dx} = -\dfrac{x^{-3}}{4} - \dfrac{2x^{-5}}{5}$

      $= -\dfrac{1}{4x^3} - \dfrac{2}{5x^5}$