SATPREP

Name_____

Assignment : Rules of derivative

Differentiate each function with respect to *x*.

1) $y = \sin 2x^3$

2) $y = \left(x^3 + 2\right)\sin x^4$

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

4) $y = e^{4x^5}$

5) $y = \ln x^5$

6) $y = \dfrac{\ln 3x^5}{4x^2 + 1}$

7) $y = \dfrac{2x^5 + 1}{e^{2x^3}}$

8) $y = \ln \left(\dfrac{2x^5}{5x^3 - 1}\right)^4$

9) $y = \dfrac{e^{3x^5}}{e^{2x^3 + 3}}$

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

Answers to Assignment : Rules of derivative

1) $\dfrac{dy}{dx} = \cos 2x^3 \cdot 6x^2$

$\quad = 6x^2 \cos 2x^3$

2) $\dfrac{dy}{dx} = (x^3 + 2) \cdot \cos x^4 \cdot 4x^3 + \sin x^4 \cdot 3x^2$

$\quad = x^2(4x^4 \cos x^4 + 8x \cos x^4 + 3\sin x^4)$

3) $\dfrac{dy}{dx} = -\sin \dfrac{x^2}{-2x^4 - 1} \cdot \dfrac{(-2x^4 - 1) \cdot 2x - x^2 \cdot -8x^3}{(-2x^4 - 1)^2}$

$\quad = -\dfrac{2x \sin \dfrac{x^2}{-2x^4 - 1} \cdot (2x^4 - 1)}{(-2x^4 - 1)^2}$

4) $\dfrac{dy}{dx} = e^{4x^5} \cdot 20x^4$

5) $\dfrac{dy}{dx} = \dfrac{1}{x^5} \cdot 5x^4$

$\quad = \dfrac{5}{x}$

6) $\dfrac{dy}{dx} = \dfrac{(4x^2 + 1) \cdot \dfrac{1}{3x^5} \cdot 15x^4 - \ln 3x^5 \cdot 8x}{(4x^2 + 1)^2}$

$\quad = \dfrac{-8x^2 \ln 3x^5 + 20x^2 + 5}{x(4x^2 + 1)^2}$

7) $\dfrac{dy}{dx} = \dfrac{e^{2x^3} \cdot 10x^4 - (2x^5 + 1) \cdot e^{2x^3} \cdot 6x^2}{\left(e^{2x^3}\right)^2}$

$\quad = \dfrac{2x^2(5x^2 - 6x^5 - 3)}{e^{2x^3}}$

8) $\dfrac{dy}{dx} = 4\left(\dfrac{1}{2x^5} \cdot 10x^4 - \dfrac{1}{5x^3 - 1} \cdot 15x^2\right)$

$\quad = \dfrac{20(2x^3 - 1)}{x(5x^3 - 1)}$

9) $\dfrac{dy}{dx} = e^{3x^5 - (2x^3 + 3)}(15x^4 - 6x^2)$

$\quad = 3x^2 e^{3x^5 - 2x^3 - 3}(5x^2 - 2)$

10) $\dfrac{dy}{dx} = e^{2x^4 - (3x^5 - 4)}(8x^3 - 15x^4)$

$\quad = x^3 e^{2x^4 - 3x^5 + 4}(8 - 15x)$