Assignment - Product Rule

Differentiate each function with respect to x.

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

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

3) $y = (-x^5 - 5) \cdot -5x^3$

4) $y = (x^3 - 5) \cdot -2x^2$
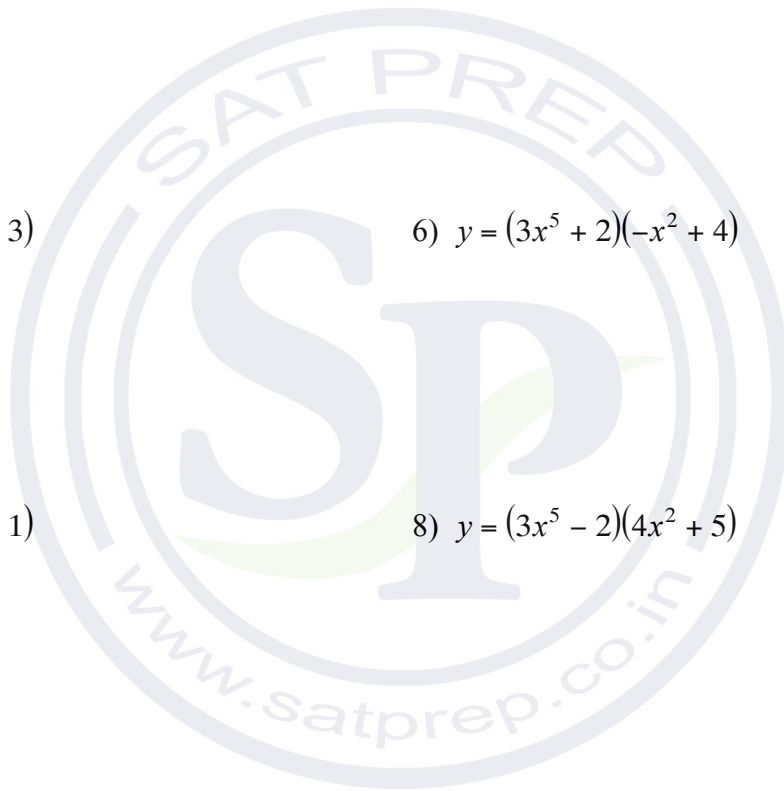
5) $y = (5x^4 - 1)(5x^5 + 3)$

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

7) $y = (2x^5 + 4)(4x^3 + 1)$

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

9) $y = (4x^5 + 3x^4 - 3)(-5x^2 + 1)$

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

Answers to Assignment - Product Rule

1) $\dfrac{dy}{dx} = 3x^5 \cdot 20x^3 + \left(5x^4 + 2\right) \cdot 15x^4$

$\quad = 135x^8 + 30x^4$

2) $\dfrac{dy}{dx} = -x^3 \cdot 20x^4 + \left(4x^5 + 5\right) \cdot -3x^2$

$\quad = -32x^7 - 15x^2$

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

$\quad = 40x^7 + 75x^2$

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

$\quad = -10x^4 + 20x$

5) $\dfrac{dy}{dx} = \left(5x^4 - 1\right) \cdot 25x^4 + \left(5x^5 + 3\right) \cdot 20x^3$

$\quad = 225x^8 - 25x^4 + 60x^3$

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

$\quad = -21x^6 + 60x^4 - 4x$

7) $\dfrac{dy}{dx} = \left(2x^5 + 4\right) \cdot 12x^2 + \left(4x^3 + 1\right) \cdot 10x^4$

$\quad = 64x^7 + 10x^4 + 48x^2$

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

$\quad = 84x^6 + 75x^4 - 16x$

9) $\dfrac{dy}{dx} = \left(4x^5 + 3x^4 - 3\right) \cdot -10x + \left(-5x^2 + 1\right)\left(20x^4 + 12x^3\right)$

$\quad = -140x^6 - 90x^5 + 20x^4 + 12x^3 + 30x$

10) $\dfrac{dy}{dx} = \left(-4x^5 + 3x^3 + 5\right) \cdot 16x^3 + \left(4x^4 + 4\right)\left(-20x^4 + 9x^2\right)$

$\quad = -144x^8 + 84x^6 - 80x^4 + 80x^3 + 36x^2$