

Gateway Exam using Product; Quotient; Chain and Power Rules AA

1. There is a 30 minute time limit.
2. No books, notes, or calculators are allowed
3. Only simplify #1.....no partial credit
4. You must have 8 out of 10 correct to pass

$$1. f(x) = \frac{5x^3 - 4x^{\frac{3}{2}} + \sqrt{x}}{x^2} \quad y' = 5 \cdot \frac{5}{2} x^{3/2} - 4$$

$$2. f(t) = 2^5 + e^{3t^2+5} + \sqrt{t^3+7t+8} \quad y' = 0 + e^{3t^2+5}(6t) + \frac{1}{2}(t^3-7t+8)^{-1/2}(3t^2+7)$$

$$3. f(x) = \ln[(5x+2)(4x^3+3)] \quad y' = \frac{1}{5x+2} \cdot 5 + \frac{1}{4x^3+3} \cdot 12x^2$$

$$4. f(x) = \arcsin(5x^2) + 10 \arctan\left(\frac{x}{5}\right) \quad y' = \frac{1}{\sqrt{1-(5x^2)^2}} \cdot 10x + \frac{10}{1+(\frac{x}{5})^2} \cdot \frac{1}{5}$$

$$5. f(x) = (\cos(5x^2) + 8x)^{\frac{3}{2}} \quad y' = \frac{3}{2} (\cos(5x^2) + 8x)^{1/2} (-\sin(5x^2)(10x) + 8)$$

$$6. f(x) = \frac{x^2 e^{3x}}{4x^3+9} \quad y' = \frac{(4x^3+9)(x^2 \cdot e^{3x} \cdot 3 + e^{3x} \cdot 2x) - (x^2 e^{3x})(12x^2)}{(4x^3+9)^2}$$

$$7. f(x) = (\tan^3 5x)(\sin 3x) \quad y' = (\tan^3 5x)(\cos 3x)(3) + (\sin 3x)(3)(\tan^2 5x)(5) \cdot 5$$

$$8. f(x) = (e^{\cos x})(\sin^2(3x)) \quad y' = e^{\cos x}(2)(\sin(3x))(\cos(3x))(3) + \sin^2(3x)(e^{\cos x})(-\sin x)$$

$$9. f(x) = \left(\frac{\ln 5x}{(8x^2+1)^{\frac{3}{2}}} \right) \text{ for } x > 0 \quad y' = \frac{(8x^2+1)^{3/2} \left(\frac{1}{5x} \right)(5) - \ln 5x \left(\frac{3}{2} \right)(8x^2+1)^{1/2} (16x)}{((8x^2+1)^{3/2})^2}$$

$$10. f(x) = 5(1.3)^x \quad y' = 5(1.3)^x \ln(1.3)$$