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Biomate.

① $f(x) = 3x^2 - x + 8$
$f'(x) = 2 * 3x^{2-1} - 1$
$f'(x) = 6x - 1$

② $g(t) = t - 3t^2 - 2t^4$
$g'(t) = 1 - 2 * 3t^{2-1} - 4 * 2t^{4-1}$
$g'(t) = 1 - 6t - 8t^3$

③ $f(x) = \overbrace{(2x+3)}^{u}\overbrace{(3x-2)}^{v}$
$f'(x) = \underset{u'}{(2)}\underset{v}{(3x-2)} + \underset{u}{(2x+3)}\underset{v'}{(3)}$
$f'(x) = 6x - 4 + 6x + 9$
$f'(x) = 12x + 5$

④ $g(x) = (2x^2 - 1)\cdot(x^3 + 2)$
$g'(x) = (4x)(x^3 + 2) + (2x^2 - 1)(3x^2)$

⑤ $h(x) = (x+1)^3$
$h'(x) = (3(x+1)$
$h'(x) = (3x)^2$
$h'(x) = 2(3x)$
$h'(x) = 6x$

Regla de la cadena
$v^n = nv \cdot v'$
$f(x) = 8x^5 - 3x^3)^{20}$

⑥ $g(t) = (4t - 7)^2$
$g'(t) = 2(4t - 7) * 4$
$g'(t) = (8t - 14) \times 4$
$g'(t) = 32t - 56$

7) $f(y) = y(2y - 1)(2y + 1)$

$f(y) = (2y^2 - y)(2y^2 + y)$

$f'(y) = (4y - 1)(2y^2 + y) + (2y^2 - y)(4y + 1)$

8) $f(x) = 4x^4 - \frac{1}{x^2}$

$f'(x) = 16x^3 - \left[\frac{0 \cdot x^2 - 1 \cdot 2x}{(x^2)^2} \right]$

$f'(x) = 16x^3 - \left[\frac{-2x}{x^4} \right]$

$= 16x^3 + \frac{2}{x^3}$

9) $g(x) = \frac{1}{x+1} - \frac{1}{x-1}$ $\quad \frac{u}{v} = \frac{u'v - uv'}{v^2}$

$g'(x) = \frac{\cancel{0(x+1)} - (1)(1+0)}{(x+1)^2} - \frac{\cancel{0(x-1)} - 1(1-0)}{(x-1)^2}$

$g'(x) = \frac{-1}{(x+1)^2} + \frac{1}{(x-1)^2}$

10) $f(t) = \frac{1}{4 - t^2}$

$f'(t) = \frac{\cancel{0(4-t^2)} - 1(0 - 2t)}{(4 - t^2)^2}$

$f'(t) = \frac{2t}{(4-t^2)^2}$

$f'(t) = 16 - 8t^2 - 4t^2$

$$\frac{u'v - uv'}{v^2}$$

(11) $h(x) = \frac{3}{x^2 + x + 1}$

$$h'(x) = \frac{0\,\cancel{(x^2+x+1)} - 3(2x+1)}{(x^2+x+1)^2}$$

$$h'(x) = \frac{-6x - 3}{(x^2+x+1)^2}$$

(12) $f(x) = \frac{1}{1 - \frac{2}{x}}$ $\qquad \frac{u}{v} = \frac{u'v - uv'}{v^2}$

$$f'(x) = \frac{\cancel{0\left(1-\frac{2}{x}\right)} - 1\left(0 - \frac{\cancel{0(x)} - 2(1)}{(x)^2}\right)}{\left(1 - \frac{2}{x}\right)^2}$$

$$f'(x) = \frac{\frac{-2}{x^2}}{\left(1 - \frac{2}{x}\right)^2}$$

(13) $g(t) = (t^2+1)(t^3+t^2+1)$

$$g'(t) = \frac{(2t)(t^3+t^2+1) + (t^2+1)(3t^2+2t)}{(2t)(t^3+t^2+1)}$$

$g'(t) = 2t^4 + \cancel{2t^3} + \cancel{2t} + 3t^4 + \cancel{2t^3} + \cancel{2t}.$

$2t^4 + 3t^4$

$5t^4 + 4t^3 + 3t^2 + 4t.$

14. $f(x) = (2x^3 - 3)(17x^4 - 6x + 2)$

$f'(x) = (6x^2)(17x^4 - 6x + 2) + (2x^3 - 3)(64x^3 - 6(1) + 0)$

$f'(x) = (6x^2)(17x^4 - 6x + 2) + (2x^3 - 3)(64x - 6)$

15. $g(z) = \frac{1}{2z} - \frac{1}{3z^2}$

$g'(z) = [\frac{2z}{9z^3}]$

$= \frac{2}{3z^3} - z^2$

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

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

17. $g(y)\ 2y(3y^2 - 1)(y^2 + 2y + 3)$

$g'(y) = 2y(3y^2 - y^2 + 6y^3 - 2y + 9y^2 - 3)$

$g'(y) = 2y(3y + 6y^3 + 8y^2 - 2y - 3)$

$g'(y) = 6y + 12 + 16y^5 - 4y^2 - 6y$

18. $f(x) = \frac{x^2 - 4}{x^2 + 4}$

$f'(x) = \frac{(x^2 + 4)(4x) - (x^2 - 4)(2x)}{(x^2 + 4)^2}$

$f'(x) = \frac{4x^3 + 16x - 2x^2 + 8x}{(x^2 + 2)^2}$

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19. $g(t) = \dfrac{t-1}{t^2+2t+1}$ $\dfrac{U}{V} = \dfrac{V \cdot U' - U \cdot V'}{V^2}$

$g'(t) = \dfrac{(t^2+2t+1)(1) - (t-1)(2t+2)}{(t^2+2t+1)^2}$

$g'(t) = \dfrac{t^2+2t+1 - 2t^2 + \cancel{2t} - \cancel{2t} + 2}{(t^2+2t+1)^2}$

$g'(t) = \dfrac{-t^2+2t+3}{(t^2+2t+1)^2}$

20. $U(x) = \dfrac{1}{(x+2)^2} = \dfrac{1}{x^2+8x+4}$ $\dfrac{C}{V} = \dfrac{-CV'}{V^2}$

$C = 1$
$C' = 0$
$V = x^2+8x+4$
$V' = 2x+8$

$U'(x) = \dfrac{-(1)(2x+8)}{(x^2+8x+4)^2}$

$U'(x) = -\dfrac{2x+8}{(x^2+8x+4)^2}$

21. $v(t) = \dfrac{1}{(t-1)^3}$ $\dfrac{U}{V} = \dfrac{V \cdot U' - U \cdot V'}{V^2}$

$v'(t) = \dfrac{\cancel{0(3t-0)} - (1)(3t)}{[(t-1)^3]^2}$

$v'(t) = \dfrac{-3t}{(t-1)^6}$

22. $h(x) = \dfrac{2x^3 + x^2 - 3x + 17}{2x - 5}$

$U = 2x^3 + x^2 - 3x + 17$

$U' = 6x^2 + 2x - 3$ $\qquad V = 2x - 5$

$\qquad\qquad V' = 2$

$$h'(x) = \frac{12x^3 + 2\cancel{4}x^2 - \cancel{6x} - 30x^2 - 10x - 15 - \cancel{4x^3} + \cancel{2x}\ \cancel{6x} - 3\cancel{4}}{(2x-5)^2}$$

$$h'(x) = \frac{8x^3 - 4x^2 - 10x - 49}{(2x-5)^2}$$

23. $g(x) = \dfrac{3x}{x^3 + 7x - 5}$ $\qquad \dfrac{U}{V} = \dfrac{V \cdot U' - V' \cdot U}{V^2}$

$$g'(x) = \frac{(x^3 + 7x - 5)(3) - (3x)(3x^2 + 7)}{(x^3 + 7x - 5)^2}$$

$$g'(x) = \frac{3x^3 + \cancel{21x} - 15 - 9x^3 - \cancel{21x}}{(x^3 + 7x - 5)^2}$$

$$g'(x) = \frac{-6x^3 - 15}{(x^3 + 7x - 5)^2}$$

24. $f(t) = \dfrac{1}{\left(t + \frac{1}{t}\right)^2} = \left(t + \frac{1}{t}\right)^{-2}$

$$f(t) = -2\left(t + \frac{1}{t}\right)^{-3} \cdot \left(1 + \frac{1}{t^2}\right)$$

$$\frac{u}{v} = \frac{u'v - uv'}{v^2}$$

(25) $g(x) = \dfrac{\left(\frac{1}{x} - \frac{2}{x^2}\right)}{\frac{2}{x^3} - \frac{3}{x^4}}$

$$g'(x) = \frac{\left(-\frac{1}{x^2} - \frac{-4x}{x^4}\right)\left[\frac{2}{x^3} - \frac{3}{x^4}\right] - \left[\frac{1}{x} - \frac{2}{x^2}\right]\left[\frac{-6x^2}{x} - \frac{12x^3}{x^8}\right]}{\left(\frac{2}{x^3} - \frac{3}{x^4}\right)^2}$$

1. $= \dfrac{0(x) - 1(1)}{x} = \dfrac{-1}{x^2}$

2. $= \dfrac{0(4x^3) - 2(2x)}{(x^2)^2} = \dfrac{-4x}{x^4}$

3. $\dfrac{\cancel{0 \cdot (x^3)} - 2(3x)}{(x^3)^2} = \dfrac{-6x}{x^6}$

4. $\dfrac{\cancel{0(x^4)} - 3(4x^3)}{(x^4)^2} = \dfrac{-12x}{x^8}$

$$f(x) = \frac{x^3 - \frac{1}{x^2+1}}{x^4 + \frac{1}{x^2+1}}$$

$$f'(x) = \frac{\left(3x^2 - \frac{0(x^2+1) - 1(2x+0)}{x^2+1}\right)\left[x^4 + \frac{1}{x^2+1}\right] - \left(x^3 - \frac{1}{x^2+1}\right)\left(4x^3 + \frac{0(x^2+1) - 1(2x+0)}{(x^2+1)^2}\right)}{\left(x^4 + \frac{1}{x^2+1}\right)^2}$$