

1: $f(x) = 3x^2 - x + 5$

$$f'(x) = 2 \cdot 3x^{2-1} - 1 - 1$$

$$f'(x) = 6x - 1$$

2: $g(t) = t - 3t^2 - 2t^4$

$$g'(t) = 1 - 2 \cdot 3t^{2-1} - 4 \cdot t^{4-1}$$

$$g'(t) = 1 - 6 + 8t^3$$

3: $f(x) = (2x+3)(3x-2)$

$$f'(x) = (2)(3x-2) + (2x+3)(3)$$

$$f'(x) = 6x - 4 + 6x + 9$$

$$f'(x) = 12x + 5$$

4: $g(x) = (2x^2 - 1)(x^3 + 2)$

$$g'(x) = \frac{d}{dx} (2x^2 - 1)(x^3 + 2)$$

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

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

$$g'(x) = 2 \cdot 5x^4 + 4 \cdot 2x - 3x^2 - 0$$

$$g'(x) = 10x^4 - 3x^2 + 8x$$

5: $h(x) = (x+1)^2$

$$h'(x) = 2(x+1) \cdot 1$$

$$h'(x) = 2(x+1)$$

$$h'(x) = 2x + 2$$

$$6: g(t) = (4t-7)^2$$

$$g'(t) = \frac{d}{dt} (4t-7)^2$$

$$g'(t) = (g^2) \cdot (4t-7)$$

$$g'(t) = 2g \cdot 4$$

$$g'(t) = 2(4t-7) \cdot 4$$

$$g'(t) = 32t - 56$$

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

$$f'(y) = \frac{d}{dy} (y \cdot (2y-1) \cdot (2y+1))$$

$$f'(y) = \frac{d}{dy} (y \cdot (4y^2 - 1))$$

$$f'(y) = (4y^3 - y)$$

$$f'(y) = (4y^3) - (y)$$

$$f'(y) = 4 \cdot 3y^2 - 1$$

$$f'(y) = 12y^2 - 1$$

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

$$f'(x) = \frac{d}{dx} \left(4x^4 - \frac{1}{x^2} \right)$$

$$f'(x) = (4x^4) - \left(\frac{1}{x^2} \right)$$

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

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

$$9: g(x) = \frac{1}{x+1} - \frac{1}{x-1}$$

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

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

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

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

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

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

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

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

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

$$12: f(x) = \frac{1}{1-\frac{2}{x}}$$

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

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

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

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

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

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

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

$$g'(t) = (2t)(t^2 + t^2 + 1) + (t^2 + 1)(3t^2 + 2t + 0)$$

$$g'(t) = (2t)(t^3 + t^2 + 1) + (t^2 + 1)(3t^2 + 2t)$$

$$g'(t) = 2t^4 + 2t^3 + 2t + 3t^4 + 3t^3 + 2t^2 + 2t$$

$$g'(x) = 5t^4 + 4t^3 + 3t^2 + 4t$$

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

$$f'(x) = \frac{d}{dx}((2x^3 - 3)(17x^4 - 6x + 2))$$

$$f'(x) = (34x^2 - 12x^4 + 4x^3 - 51x^4 + 18x - 6)$$

$$f'(x) = (34x^2 - 63x^4 + 4x^3 + 18x - 6)$$

$$f'(x) = (34x^2) + (-63x^4) + (4x^3) + (18x) - (6)$$

$$f'(x) = 34 \cdot 4x^6 - 63 \cdot 4x^3 + 4 \cdot 3x^2 + 18 - 0$$

$$f'(x) = 238x^6 - 252x^3 + 12x^2 + 18$$

$$15: g'(2) = \frac{d}{dx} \left(\frac{1}{22} - \frac{1}{32x} \right)$$

$$g'(2) = \left(\frac{1}{22} - \frac{1}{1024} \right)$$

$$g'(2) = \left(\frac{501}{11264} \right)$$

$$g'(2) = 0$$

16: f(x) = 2x^3 - 3x^2 + 4x - 5

f'(x) = d/dx (2x^3 - 3x^2 + 4x - 5) = (2*3x^2 - 3*2x + 4/x - 5/x^2)

f'(x) = 2 - 4 + 10/x^2

17: g(y) = 2y(3y^2 - 1)(y^2 + 2y + 3)

g'(y) = d/dy (2y(3y^2 - 1)(y^2 + 2y + 3))

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

g'(y) = (6y^5 + 12y^4 + 18y^3 - 2y^3 - 4y^2 - 6y)

g'(y) = (y^5 + 12y^4 + 16y^3 - 4y^2 - 6y)

g'(y) = (6y^2) + (12y^4) + (16y^3) + (-4y^2) + (-6y)

g'(y) = 6.5y^4 + 12.4y^3 + 16.3y^2 - 4.2y - 6

g'(y) = 30y^4 + 48y^3 + 48y^2 - 8y - 6

18: F(x) = (x^2 - 4) / (x^2 + 4)

F'(x) = d/dx ((x^2 - 4) / (x^2 + 4))

F'(x) = ((x^2 - 4)(x^2 + 4) - (x^2 - 4)(x^2 + 4)) / (x^2 + 4)^2

F'(x) = (2x(x^2 + 4) - (x^2 - 4)2x) / (x^2 + 4)^2

F'(x) = (16x) / (x^2 + 4)^2

19: $g(t) = \frac{t-1}{t^2+2t+1}$

$$g'(t) = \frac{(1-0)(t^2+2t+1) - (t-1)(2t+2+0)}{(t^2+2t+1)^2}$$

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

20: $u(x) = \frac{1}{(x+2)^2}$

$$u'(x) = \frac{0(x+2)^2 - 1[2(x+2)(1)]}{[(x+2)^2]^2}$$

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

21: $v(t) = \frac{1}{(t-1)^3}$

$$v'(t) = \frac{d}{dt} \left(\frac{1}{(t-1)^3} \right)$$

$$v'(t) = \frac{(t-1)^3}{((t-1)^3)^2}$$

$$v'(t) = \frac{3(t-1)^2}{((t-1)^3)^2}$$

$$v'(t) = \frac{3 \cdot 2 \cdot 1}{((t-1)^3)^2}$$

$$v'(t) = \frac{3(t-1)^2}{((t-1)^3)^2}$$

$$v'(t) = \frac{3}{(t-1)^4}$$

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

$$h'(x) = \frac{d}{dx} \left(\frac{2x^3 + x^2 - 3x + 17}{2x - 5} \right)$$

$$h'(x) = \frac{(2x^3 + x^2 - 3x + 17)(2) - (2x^3 + x^2 - 3x + 17)(2x - 5)}{(2x - 5)^2}$$

$$h'(x) = \frac{(2 \cdot 3x^2 + 2x - 3)(2x - 5) - (2x^3 + x^2 - 3x + 17) \cdot 2}{(2x - 5)^2}$$

$$h'(x) = \frac{10x^3 - 19x^2 - 20x - 17}{(2x - 5)^2}$$

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

$$g'(x) = \frac{d}{dx} \left(\frac{3x}{x^3 + 7x - 5} \right)$$

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

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

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

$$g'(x) = -6x^3 + 15$$

$$(x^3 + 7x - 5)^2$$

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

$$f'(t) = \frac{d}{dt} \left(\frac{1}{\left(1 + \frac{1}{t}\right)^2} \right)$$

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

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

$$f'(t) = \frac{(t^2)(t+1)^2 - t^2(t+1)^2}{((t+1)^2)^2}$$

$$f'(t) = \frac{2t(t+1)^2 - t^2 \cdot 2(t+1)}{((t+1)^2)^2}$$

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

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

$$f'(x) = \frac{1}{x} \quad f'(x) = 0(x) - 1(x^{-1}) = -1$$

$$\frac{-1}{x^2}$$

$$g(x) = \frac{2}{x^2} \quad g'(x) = \frac{0(x^2) - 2(2)}{(x^2)^2} = \frac{-4x}{x^4}$$

$$h(x) = \frac{2}{x^3} \quad h'(x) = \frac{0(x^3) - 2(3x^2)}{(x^3)^2} = \frac{-6x^2}{x^6}$$

$$l(x) = \frac{-3}{x^4} \quad l'(x) = \frac{0(x^4) - 3(4x^3)}{(x^4)^2}$$

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

$$\left[\frac{-6x^2}{x^2} - \frac{12}{x^8} - 3 \right]$$

$$\left[\frac{2}{x^3} - \frac{3}{x^4} \right]^2$$

$$\frac{0}{v} = \frac{uv - vv}{v^2}$$

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