3. $f(x) = 2x^3 - 3x^2 + 1;\ f'(x) = 6x^2 - 6x;\ f''(x) = 12x - 6 = 6(2x-1).$

8. $g(t) = t^2(3t+1)^4;$

$$g'(t) = 2t(3t+1)^4 + t^2(4)(3t+1)^3(3) = 2t(3t+1)^3[(3t+1)+6t]$$
$$= (3t+1)^3(18t^2+2t);$$
$$g''(t) = 2t(9t+1)^3(3t+1)^2(3) + (3t+1)^3(36t+2)$$
$$= 2(3t+1)^2[9t(9t+1)+(3t+1)(18t+1)]$$

$$= 2(3t+1)^2(81t^2+9t+54t^2+3t+18t+1) = 2(135t^2+30t+1)(3t+1)^2.$$

13. $f(x) = x(x^2+1)^2;$

$$f'(x) = (x^2+1)^2 + x(2)(x^2+1)(2x)$$
$$= (x^2+1)[(x^2+1)+4x^2] = (x^2+1)(5x^2+1);$$
$$f''(x) = 2x(5x^2+1) + (x^2+1)(10x) = 2x(5x^2+1+5x^2+5)$$
$$= 4x(5x^2+3).$$

16. $g(t) = \dfrac{t^2}{t-1};\quad g'(t) = \dfrac{(t-1)(2t)-t^2(1)}{(t-1)^2} = \dfrac{t^2-2t}{(t-1)^2} = \dfrac{t(t-2)}{(t-1)^2};$

$$g''(t) = \frac{(t-1)^2(2t-2)-t(t-2)2(t-1)}{(t-1)^4} = \frac{2(t-1)[(t-1)^2-t(t-2)]}{(t-1)^4} = \frac{2}{(t-1)^3}.$$

20. $f(x) = \sqrt{2x-1} = (2x-1)^{1/2}.$

$$f'(x) = \frac{1}{2}(2x-1)^{-1/2}(2) = (2x-1)^{-1/2} = \frac{1}{\sqrt{2x-1}}.$$
$$f''(x) = -\frac{1}{2}(2x-1)^{-3/2}(2) = -(2x-1)^{-3/2} = -\frac{1}{\sqrt{(2x-1)^3}}.$$

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36. $x^3 + y^3 = 28$. Differentiating implicitly, we have

$$3x^2 + 3y^2y' = 0, \text{ or } y' = -\frac{x^2}{y^2}.$$

Differentiating again, we have $6x + 3y^2y'' + 6y(y')^2 = 0.$

So $y'' = -\dfrac{2y(y')^2+2x}{y^2}$. But $\dfrac{dy}{dx} = -\dfrac{x^2}{y^2}$, and, therefore,

$$y'' = -\frac{2y\left(\frac{x^4}{y^4}\right)+2x}{y^2} = -\frac{2\left(\frac{x^4}{y^3}+x\right)}{y^2} = -\frac{2x(x^3+y^3)}{y^5}.$$