1. Let $f(x) = (2x + 1)^3$ and g be the inverse function of f. Given that $f(0) = 1$, find $g'(1)$.

$$g'(1) = \frac{1}{f'(0)}$$

$$f'(x) = 3(2x+1)^2(2)$$

$$f'(0) = 3(1^2)(2) = 6$$

$$\frac{1}{f'(0)} = \boxed{\frac{1}{6}}$$

2. Let $f(x) = 2x + e^x$. If $g(x) = f^{-1}(x)$ and the point $(0,1)$ is on f, find $g'(1)$.

$$g'(1) = \frac{1}{f'(0)}$$

$$f'(x) = 2 + e^x$$

$$f'(0) = 2 + e^0 = 2 + 1 = 3$$

$$\boxed{g'(1) = \frac{1}{3}}$$

3. If g and f are inverse functions, use the chart below to find g'(4).

x	$f(x)$	$g(x)$	$f'(x)$
–4	0	–9	5
–2	4	–7	4
0	6	–4	2
2	7	–3	1
4	10	–2	3

$g(4) = -2$

$g: (4, -2) \quad f: (-2, 4)$

$g'(4) = \frac{1}{f'(-2)}$

$= \boxed{\frac{1}{4}}$

4. The function f is defined by $f(x) = x^3 + 4x + 2$. If f and g are inverses and g(2) = 0, find g'(2).

$$g'(2) = \frac{1}{f'(0)}$$

$$f'(x) = 3x^2 + 4$$

$$f'(0) = 4$$

$$\boxed{g'(2) = \frac{1}{4}}$$

5. Let f be the function $f(x) = x^3 + x^2 + x$. Let f and g be inverse functions and g(3) = 1. What is the value of g'(3)?

$$g'(3) = \frac{1}{f'(1)}$$

$$f'(x) = 3x^2 + 2x + 1$$

$$f'(1) = 3 + 2 + 1 = 6$$

$$g'(3) = \boxed{\frac{1}{6}}$$