Umkehrfunktion

a) $f'(x) = \frac{-2}{(x-3)^2} < 0$ für alle $x > 3 \Rightarrow$ st.m.f.

$$y = \frac{2}{x-3}$$

$$y \cdot (x-3) = 2$$

$$x - 3 = \frac{2}{y}$$

$$x = \frac{2}{y} + 3$$

$f^{-1}(x) = \frac{2}{x} + 3 \qquad D_{f^{-1}} = \mathbb{R}\backslash\{0\}\,; W_{f^{-1}} =]3\,;\ +\infty[$

b) $f'(x) = \frac{6}{x^2} > 0$ für alle $x < 0 \Rightarrow$ st.m.st.

$$y = 4 - \frac{6}{x}$$

$$y - 4 = -\frac{6}{x}$$

$$(y-4) \cdot x = -6$$

$$x = -\frac{6}{y-4}$$

$f^{-1}(x) = -\frac{6}{y-4} \qquad D_{f^{-1}} = \mathbb{R}\backslash\{4\}\,; W_{f^{-1}} =]0\,;\ +\infty[$

c) $f: x \mapsto (x-3)^2\,; x > 3$

$f'(x) = 2 \cdot (x-3) > 0$ für alle $x > 3 \Rightarrow$ st.m.st.

$$y = (x-3)^2$$

$$\sqrt{y} = x - 3$$

$$\sqrt{y} + 3 = x$$

$f^{-1}(x) = \sqrt{x} + 3 \quad D_{f^{-1}} = \mathbb{R}_0^+\,; W_{f^{-1}} =]3\,;\ +\infty[$