① Find the inverse of:

a) $f(x) = 3x + 4$

$y = 3x + 4$

$x = 3y + 4$

$-4 \quad -4$

$\frac{x-4}{3} = \frac{3y}{3}$

$y = \frac{x-4}{3}$

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

inverse of f(x)

b) $g(x) = x^2 - 1$

$y = x^2 - 1$

$x = y^2 - 1$

$+1 \quad +1$

$\sqrt{x+1} = \sqrt{y^2}$

$\boxed{g^{-1}(x) = \sqrt{x+1}}$

② Are the following 2 functions inverses of one another?

$k(x) = \sqrt{x-2} \qquad j(x) = x^2 + 2$

$x^2 = (\sqrt{y-2})^2$

$x^2 = y - 2$

$x^2 + 2 = y$ ✓

① $k(j(x)) = x$

② $j(k(x)) = x$

① $k(j(x)) = k(x^2 + 2)$

$\sqrt{(x^2 + \cancel{2}) - \cancel{2}} = \sqrt{x^2} = x$ ✓

② $j(k(x)) = j(\sqrt{x-2}) = (\cancel{\sqrt{}}x-2)^{\cancel{2}} + 2$

$= x - 2 + 2$

$= x$ ✓

Rationalize the denominator

① $\sqrt{\frac{7}{\ }} = \frac{\sqrt{7}}{\ } \cdot \frac{\sqrt{6}}{\ } = \frac{\sqrt{42}}{\ } = \boxed{\frac{\sqrt{42}}{\ }}$

① $\sqrt{\frac{7}{6}} = \frac{\sqrt{7}}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{\sqrt{42}}{\sqrt{36}} = \boxed{\frac{\sqrt{42}}{6}}$

② $\sqrt{\frac{8}{25y}} = \frac{\sqrt{8}}{\sqrt{25y}} = \frac{\sqrt{4 \cdot 2}}{5\sqrt{y}} = \frac{2\sqrt{2}}{5\sqrt{y}} \cdot \frac{\sqrt{y}}{\sqrt{y}} = \frac{2\sqrt{2y}}{5\sqrt[2]{y^2}} = \boxed{\frac{2\sqrt{2y}}{5y}}$

③ $\sqrt[3]{\frac{10}{27a^4}} = \frac{\sqrt[3]{10}}{\sqrt[3]{27a^4}} = \frac{\sqrt[3]{10}}{3\sqrt[3]{a^4}} = \frac{\sqrt[3]{10}}{3 \cdot \sqrt[3]{a^3 \cdot a}} = \frac{\sqrt[3]{10}}{3a \cdot \sqrt[3]{a}} \cdot \frac{\sqrt[3]{a^2}}{\sqrt[3]{a^2}} = \frac{\sqrt[3]{10a^2}}{3a\sqrt[3]{a^3}}$

$a^1 \cdot a^2 = a^3$

$= \frac{\sqrt[3]{10a^2}}{3a \cdot a}$

$= \boxed{\frac{\sqrt[3]{10a^2}}{3a^2}}$

④ $\frac{(\sqrt{3} - 2)}{(5 + \sqrt{3})} \cdot \frac{(5 - \sqrt{3})}{(5 - \sqrt{3})} = \frac{5\sqrt{3} - 3 - 10 + 2\sqrt{3}}{25 - 3}$

$(\sqrt{3})(\sqrt{3})$

$\sqrt{9} = 3$

$= \boxed{\frac{7\sqrt{3} - 13}{22}}$

Ex: $(x+2)(x - 2)$