The function of g is defined as $g(x) = \frac{1-mx}{x-2m}$, $x \neq 2m$. If $g(3) = 2$, find.

a) the value of m.
b) $g \circ g(9)$
c) $g^{-1}(x)$.

$m = 5$
$= -\frac{219}{34}$
$= \frac{1+10x}{x+5}$

a) $\frac{1-m(3)}{(3)-2m} = \frac{1-3m}{3-2m} = 2$

$1-3m = 2(3-2m)$

$1-3m = 6-4m$

$-3m+4m = 6-1$

$m = 5$ ✓

b) $g \circ g(9) = g(g(9)) \rightarrow g(9) = \frac{1-45}{9-10} = 44$

$= \frac{1-(44)(5)}{44-10}$

$= -\frac{219}{34}$

c) $g^{-1}(x)$ = Let $y = \frac{1-5x}{x-10}$

$xy - 10y = 1 - 5x$

$xy + 5x = 1 + 10y$

$x(y+5) = 1+10y$

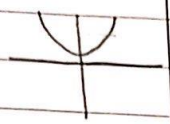
$y+5$

$g^{-1}(x) = \frac{1+10y}{y+5}$

Given that $f(x) = 2x^2 + 14$ and $g(x) = \sqrt{x-2}$, find

a) the domain of $f(x)$ and $g(x)$. $= D_f = (-\infty, \infty)$
b) $(f \circ g)(x)$. $= f(g(x)) = 2x + 10$ $= D_g = [2, \infty)$
c) the value of x if $(f \circ g)(x) = g^{-1}(x)$. $= x = -2$ or 4

a) i) $f(x) = 2x^2 + 14$



$2x^2 = 0$

$x = 0$

Domain$_f$: $(-\infty, 0) \cup (0, \infty)$

ii) $g(x) = \sqrt{x-2}$

$\sqrt{x-2} = 0$

$x = 2$

Domain$_g$: $(2, \infty)$

b) $(f \circ g)(x) = f[g(x)]$

$= 2(\sqrt{x-2})^2 + 14$

$= 2(x-2) + 14$

$= 2x - 4 + 14$

$= 2x + 10$.

$f(g(x)) = 2x + 10$

c) $f(g(x)) = g^{-1}(x)$

Let $g(x) = y$

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

$x - 2 = y^2$

$x = y^2 + 2$

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

$2x + 10 = x^2 + 2$

$-x^2 + 2x + 10 - 2 = 0$

$-x^2 + 2x + 8 = 0$

$x_1 = -2, x_2 = 4$