(2) $R \to R$.

$(f+g)oh = foh + goh$

$\Rightarrow (f+g)h(x)$

$\Rightarrow f\,h(x) + g\,h(x)$

$\Rightarrow fog + goh \longrightarrow$ Hence proved!!

LHS = RHS

(3) (i) $f(x) = |x|$ and $g(x) = |5x-2|$

~~f~~ $fog \Rightarrow fg(x)$

$f|5x-2|$

$\Rightarrow$ ~~\|5x-2\|~~ $||5x-2||$

$\Rightarrow |5x-2|$

$gof \Rightarrow gf(x)$

$g(x)$

$g\,|5|x|-2|$

(ii) $f(x) = 8x^3$ and $g(x) = x^{\frac{1}{3}}$.

$gof \Rightarrow gf(x)$

$\Rightarrow g(8x^3)$

$\Rightarrow (8x^3)^{1/3} \Rightarrow \{(2x)^3\}^{1/3} \Rightarrow 2x$

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$fog \Rightarrow f\,g(x)$

$\Rightarrow f(x^{1/3})$

$8(x^{1/3})^3$

$\Rightarrow \underline{\underline{8x}}$ Ans

(4) $f(x) = \dfrac{(4x+3)}{(6x-4)}$, $x \neq \frac{2}{3}$.

show that $fof(x) = x$. what is inverse of f?

$\boxed{fof(x) = x}$

$\Rightarrow \dfrac{4\left(\dfrac{4x+3}{6x-4}\right)+3}{6\left(\dfrac{4x+3}{6x-4}\right)-4}$

$\Rightarrow \dfrac{4\left(\dfrac{4x+3+3(6x-4)}{6x-4}\right)}{6\left(\dfrac{4x+3-4(6x-4)}{6x-4}\right)}$

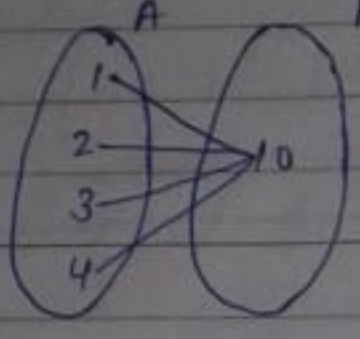
$\Rightarrow \dfrac{16x+12+18x-12}{24x+18-24x+16}$

$\Rightarrow \dfrac{16x+18x}{18+16} \Rightarrow \dfrac{34x}{34} \Rightarrow \underline{x}$

Hence, Inverse of f is x.

(5) (i) $f: \{1,2,3,4\} \to \{10\}$

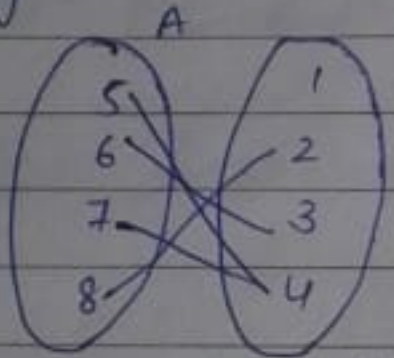
$f = \{(1,10), (2,10), (3,10), (4,10)\}$.



Here, It is not ~~onto~~ one-one function.
for Inverse, the function should be bijective.
so, It does not have Inverse.

(ii) $g: \{5,6,7,8\} \to \{1,2,3,4\}$

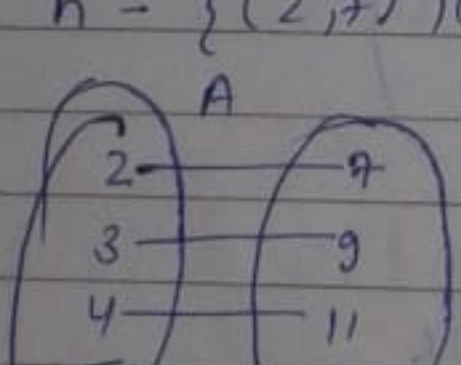
$g = \{(5,4), (6,3), (7,4), (8,2)\}$.



Here, It is not one-one function and It is not onto function because
Range ≠ co domain
for Inverse, the function should be bijective.
so, It does not have Inverse.

(iii) $h: \{2,3,4,5\} \to \{7,9,11,13\}$

$h = \{(2,7), (3,9), (4,11), (5,13)\}$.



Here, It is one-one function.
Domain set is all paired.
Here, It is onto function
⇒ Range = co-domain.
for Inverse, the function should be bijective.
Hence, It is bijective
so, It have Inverse of functions.

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(6) $f = [-1,1] \to \mathbb{R}$

$f(x) = \frac{x}{(x+2)}$ is one-one.

find Inverse. $f : [-1,1] \to$ Range f.

$$f(x) = \frac{x}{(x+2)}$$

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

$$x = y(x+2)$$

$$x = yx + 2y.$$

$$yx - x = -2y$$

$$x(y-1) = -2y$$

$$x = \frac{-2y}{y-1} \quad \frac{+2y}{+(1-y)}$$

$$\therefore g(y) = \frac{2y}{(1-y)}$$

$$fog = fg(y)$$

$$= 1\left(\frac{2y}{1-y}\right)$$

$$= \frac{\frac{2y}{1-y}}{\frac{2y}{1-y} + 2}$$

$$\Rightarrow \frac{\frac{2y}{1-y}}{\frac{2y + 2 - 2y}{1-y}} \Rightarrow \frac{2y}{2}$$

Here

$$fog = y.$$