Subject: DISCRETE MATH

No:

Date:

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WORKSHEET 9

1. $f(x) = x^2 + 1$

$g(x) = x - 3$

(a) $f(g(x))$

$f[g(x)] = f[g(x)]$

$= f(x-3)$

$f(g(x)) = (x-3)^2 + 1$

$f(g(2)) = (2-3)^2 + 1$

$= 1 + 1$

$= 2$

(b) $g(f(x)) = 7$

$g(f(x)) = 7$

$g[f(x)] = 7$

$g(x^2+1) = 7$

$x^2 + 1 - 3 = 7$

$x^2 = 7 - 1 + 3$

$x^2 = 9$

$x = \sqrt{9}$

$= 3$ $x = \pm 3$

$x = 3$ or $x = -3$

(c) $g^{-1}(5)$

$g(x) = x - 3$

let $y = x - 3$

$y + 3 = x$

$g^{-1}(x) = x + 3$

$g^{-1}(5) = 5 + 3$

$= 8$

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2. Inverse functions

(a) $y = 3x + 2$ ✓

$y - 2 = 3x$ ✓

$\frac{y-2}{3} = x$ ✓

$y^{-1}(x) = \frac{x-2}{3}$ ✓

(b) $y = \frac{1}{4-x}$ ✓

$y = 4 - x$

$x = 4 - y$

$y^{-1}(x) = 4 - x$

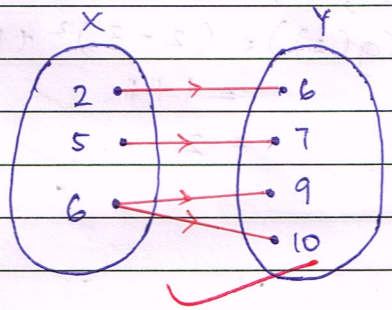
$4 - x = \frac{1}{y}$

$4 - \frac{1}{y} = x$

$y^{-1}(x) = 4 - \frac{1}{x}, x \neq$

3. Determine whether the relation given is a function. Explain your answer.

| Domain | Range |
|---|---|
| 2 | 6 |
| 5 | 7 |
| 6 | 9 |
| 6 | 10 |

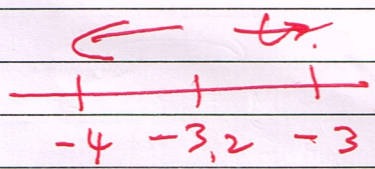



$R = \{(2,6), (5,7), (6,9), (6,10)\}$

∴ The relation is not a function because 6 is not assigned to unique element in Y. ✓

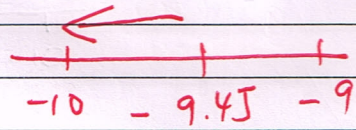
4 (a) $\lfloor -3.2 \rfloor$

$= -3$ ✗




(b) $\lceil -9.45 \rceil$

$= -10$




Redo.

(c) $\lceil \lfloor 3.89 + 2.3 \rfloor \times 2 \rceil$

$= \lceil \lfloor 6.19 \rfloor \times 2 \rceil$

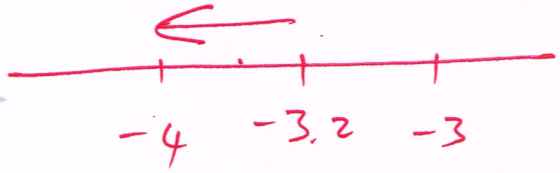
$= \lceil \lfloor 12.38 \rfloor \rceil$ ✗

$= \lceil 12 \rceil$

$= \lceil 12 \rceil$

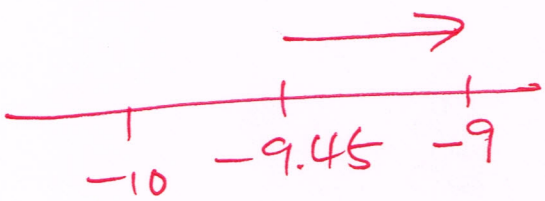
You cannot multiply before you settle it.

$\lfloor -3.2 \rfloor = -4$




floor — to left.

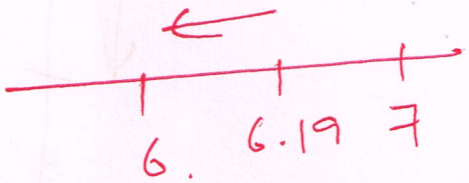
$\lceil -9.45 \rceil = -9$




ceiling — to right.

$\lceil \lfloor 3.89 + 2.3 \rfloor \times 2 \rceil$

$= \lceil \lfloor 6.19 \rfloor \times 2 \rceil$




$= \lceil 6 \times 2 \rceil$

$= 12$