

Name: \_\_\_\_\_

Show work needed to justify your answer.

Date: \_\_\_\_\_

HW: # 2: Math IBSL - Standard 2 - Function Notation

5 points

1 Calculate the substitutions indicated for each given function.

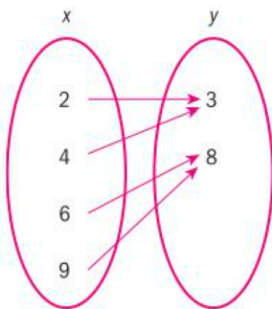
a  $g(x) = -x^2 + 2$ ,  $g(-4)$

b  $f: x \rightarrow 5x - 1$ ,  $f(-9)$

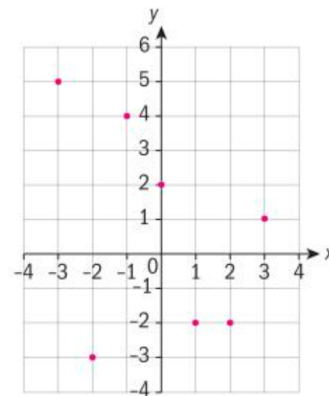
c  $C(n) = 20n + 250$ ,  $C(100)$

d  $h(x) = -4$ ,  $h(5)$

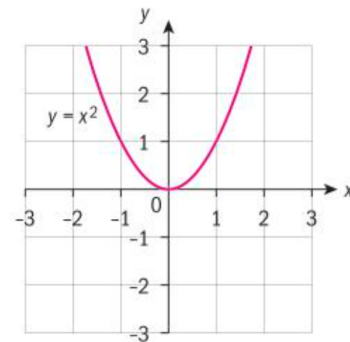
e  $f(2)$  for the mapping diagram below



f  $f(-3)$  for the graph below



g  $f(-1)$  for the graph below



1a.  $g(-4) = -(-4)^2 + 2 \rightarrow g(-4) = -16 + 2 \rightarrow \boxed{g(-4) = -14}$

b.  $f(-9) = 5(-9) - 1 \rightarrow f(-9) = -45 - 1 \rightarrow \boxed{f(-9) = -46}$

c.  $C(100) = 20(100) + 250 \rightarrow 2000 + 250 \rightarrow \boxed{C(100) = 2250}$

d.  $\boxed{h(5) = -4}$

e.  $\boxed{f(2) = 3}$

f.  $\boxed{f(-3) = 5}$

g.  $\boxed{f(-1) = 1}$

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2 If  $f(x) = -3x^2 - 1$ ,  $g(x) = -4x + 7$  and  $h(x) = 6$ , find:

a  $f(-3)$       b  $g(15)$

c  $f(1) + g(-1)$       d  $h(0)$

e  $f(x-2)$       f  $g(n)$

- 5 A British telecommunications company offers the following roaming data package to its customers: a flat fee of £25 plus £10 per gigabyte of data
- Express the total cost,  $C$ , as a function of the number of gigabytes of data ( $g$ ).
  - What values of  $g$  do not make sense in this context?
  - State the notation that could be used to find the roaming cost for a trip where 14 gb of data is used? Calculate this value.
  - State the notation that could be used to find the number of gigabytes of data one can use for a total bill of £100. Calculate this value.

a)  $C(g) = 10g + 25$

b)  $g < 0$

c)  $C(14) = 10(14) + 25$

$C(14) = 165$

d)  $100 = 10g + 25$

$75 = 10g$

$g = 7.5 \text{ g/g}$

2 a)  $f(-3) = -3(-3)^2 - 1 \rightarrow -3(9) - 1 \rightarrow -27 - 1 \rightarrow f(-3) = -28$

b)  $g(15) = -4(15) + 7 \rightarrow -60 + 7 \rightarrow g(15) = -53$

c)  $f(1) + g(-1) = -4 + 11 \rightarrow f(1) + g(-1) = 7$

d)  $h(0) = 6$

$$\begin{aligned}
 \text{e) } f(x-2) &= -3(x-2)^2 - 1 \rightarrow -3(x-2)(x-2) - 1 \\
 &= -3(x^2 - 4x + 4) - 1 \\
 &= -3x^2 + 12x - 12 - 1
 \end{aligned}$$

$f(x-2) = -3x^2 + 12x - 13$

f)  $g(n) = -4n + 7$