

Group Quiz 1
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Math 115

key

No Calculators

Begin by removing nearly all content ...

Mathematician on Category Theory

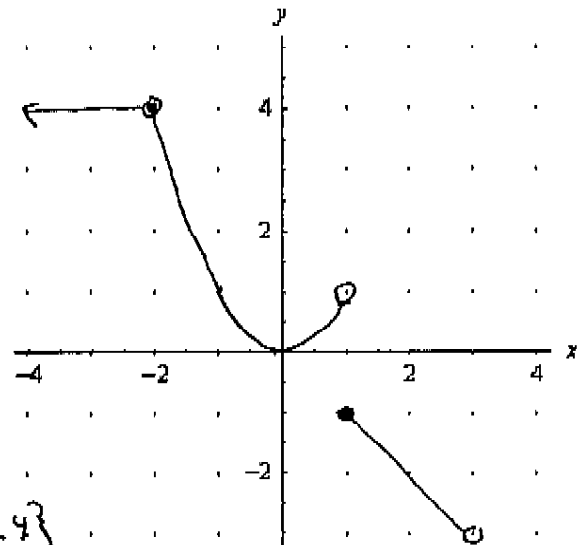
1.) For $f(x) = x^2 - 3x$, evaluate $\frac{f(a+h) - f(a)}{h}$ and give its geometric interpretation.

$$\begin{aligned} DQ &= \frac{[(a+h)^2 - 3(a+h)] - [a^2 - 3a]}{h} \\ &= \frac{a^2 + 2ah + h^2 - 3a - 3h - a^2 + 3a}{h} \\ &= \frac{2ah + h^2 - 3h}{h} \\ &= 2a - 3 + h // \end{aligned}$$

This is the slope of the secant line of f on $[a, a+h]$.

2.) Carefully sketch a graph of $f(x) = \begin{cases} 4 & x < -2 \\ x^2 & -2 \leq x < 1 \\ -x & 1 \leq x < 3 \end{cases}$ and express the domain and range of f in set notation.

notation.



Domain: $\{x \mid x < 3\}$

Range: $\{y \mid -3 < y < -1 \text{ or } 0 \leq y \leq 4\}$

3.) Given the graph of $h(x)$ ~~given~~, perform the following:

Express the equation of the function graphed in terms of $h(x)$. For example, if the graph was shifted up one, you might write " $h(x)+1$."

a.) $h(-\frac{1}{2}x)$

b.) $-2h(x+1)+6$

Graph the following functions on the given axes

c.) $h(1-x)-3 = h(-(x-1))-3$

d.) $2h(\frac{x-1}{3})-4$

