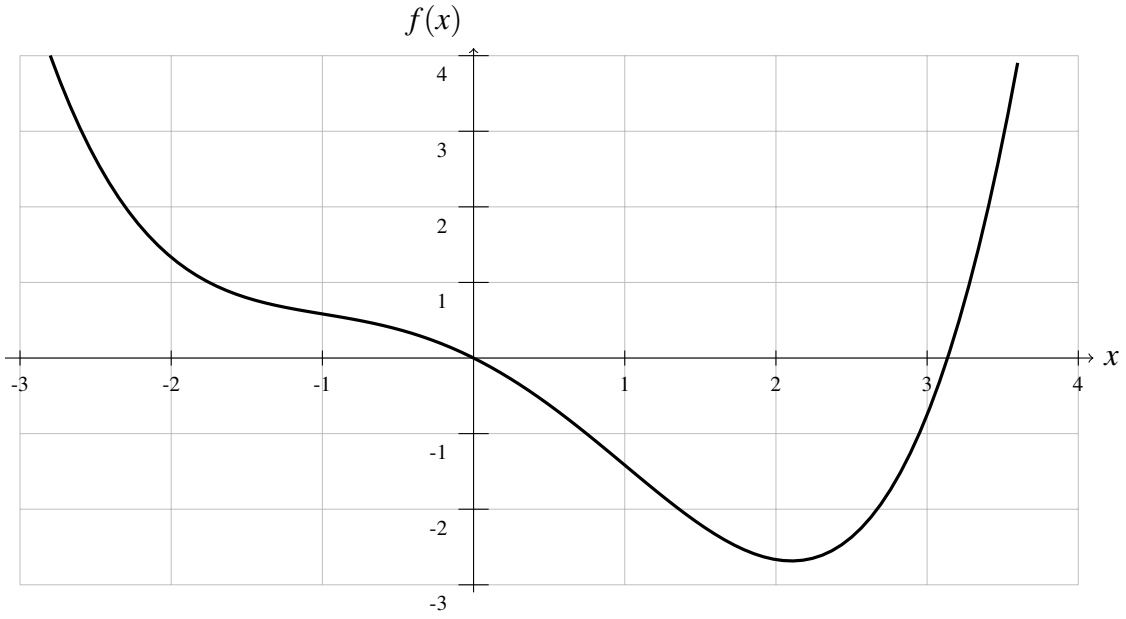
MATH 201 Your name: _____

Learning target DF1, version 3

Below is a graph of the function $f(x) = \dfrac{x^4}{12} - \dfrac{x^2}{2} - x$.



(a) On the graph above, draw the tangent line to the curve at $x = -1$.

(b) On the graph above, draw a secant line that goes through the curve at $x = -1$ and at some other nearby x-value of your choice.

(c) Calculate the slope of that secant line.

(d) Use $f'(x)$ to calculate the slope of the tangent line. Compare the value you get here to the value you got in part (c). Does that make sense?

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Learning target DF2, version 3

Suppose that $p(z) = -2z^3 + 5z^2 - 4z + 4$. Use the limit definition of the derivative to find $p'(z)$.

Algebra hint: $(z+h)^3 = z^3 + 3z^2h + 3zh^2 + h^3$.

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Learning target DFa, version 3

Let $f(t)$ be the number of centimeters of rain that have fallen since midnight, where t is the time in hours. What do each of the following mean?
Give units to every number that you write down; **don't say "per" and don't say "rate".**

(a) $f(3) = 1.5$

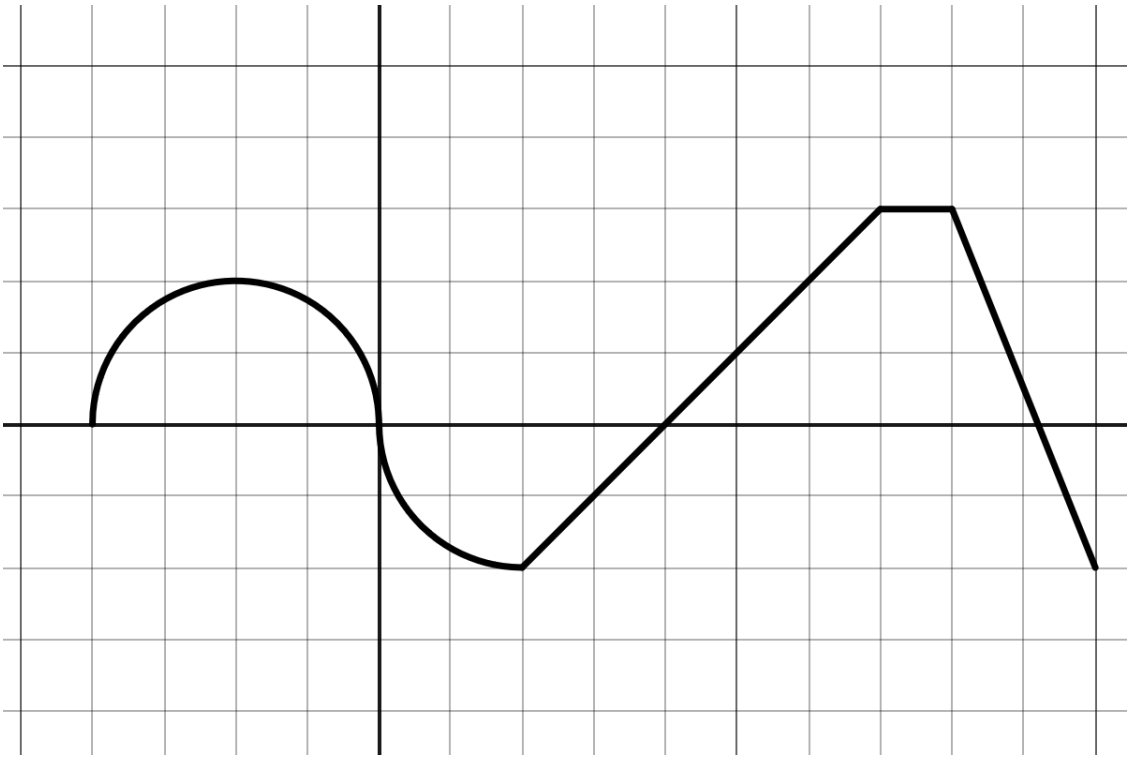
(b) $f'(3) = 0.2$

(c) Would the statement $f'(5) = -0.7$ make sense? Why or why not?

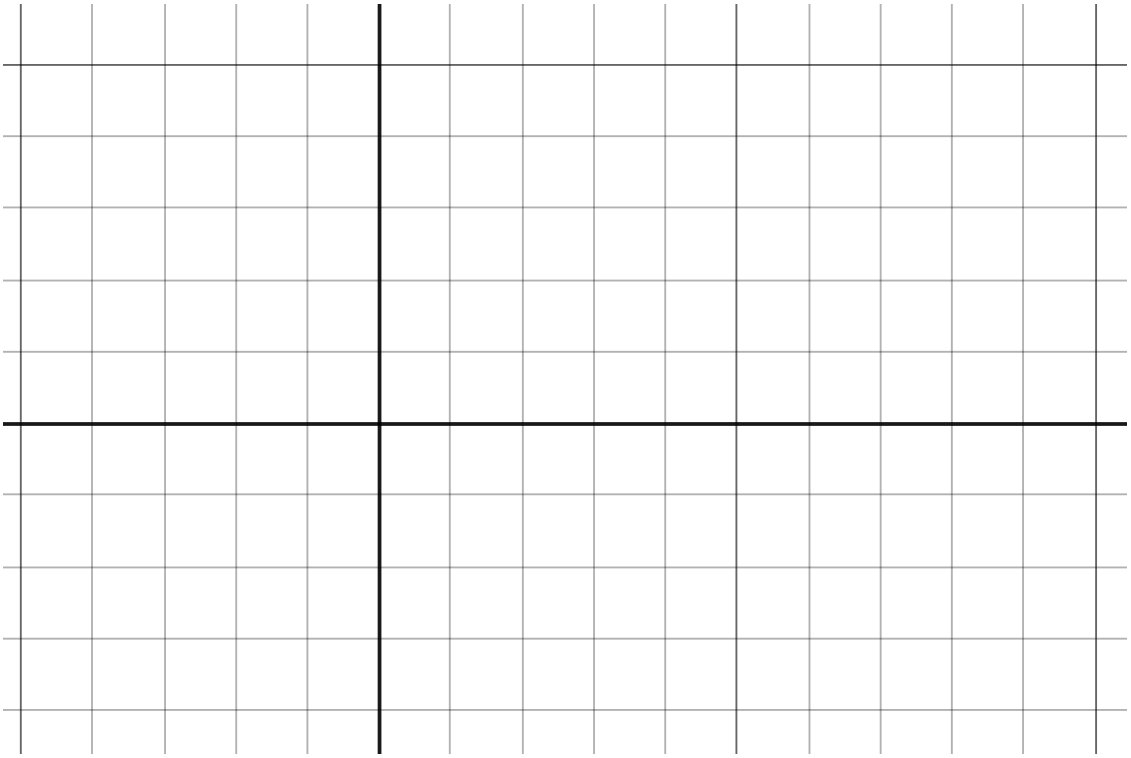
MATH 201 Your name: _____

Learning target DFb, version 4

Here is the graph of some wacky function $q(t)$:



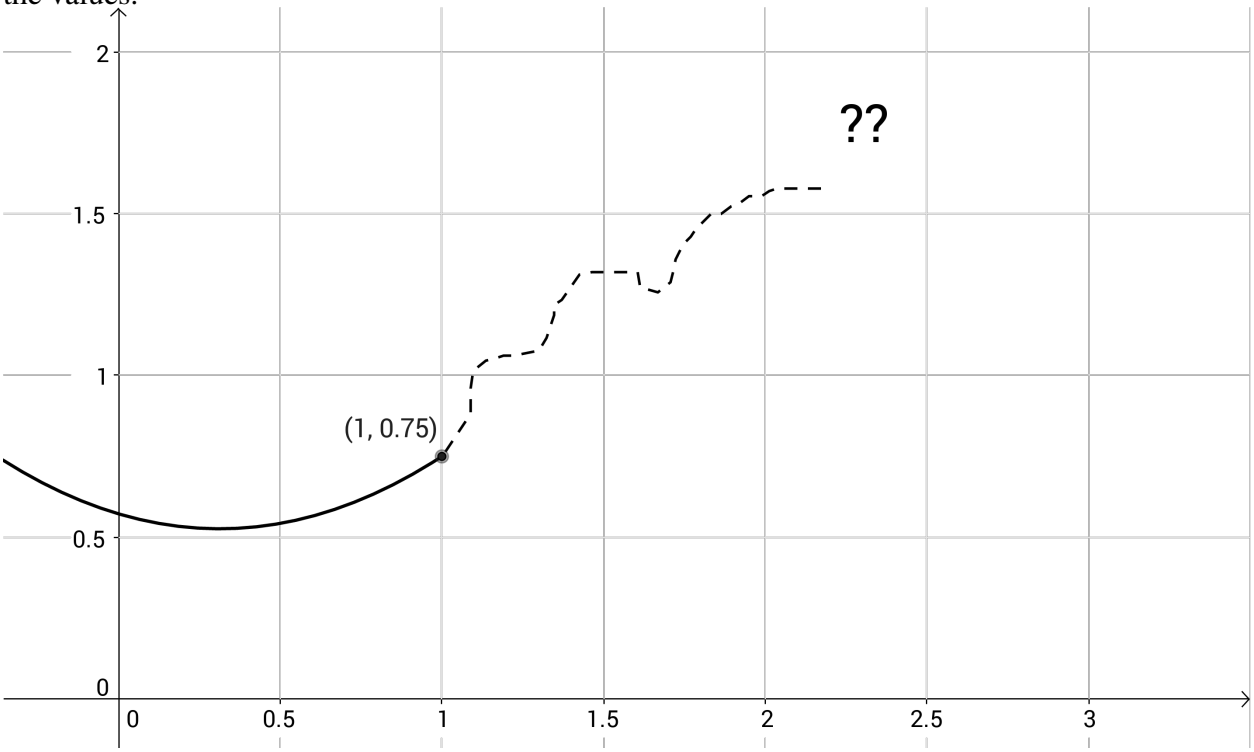
Sketch the graph of $q'(t)$ on the blank axes below.



MATH 201 Your name: _____

Learning target AD2, version 4

Part of the graph of this function $f(x)$ has been erased. We'll use linear approximation to recover the values.



(a) Draw the tangent line to this function at $x = 1$.

(b) Suppose we know that $f'(1) = 0.65$. Use point-slope form to write down an equation for $L(x)$, the tangent line to this function at $x = 1$.

(c) Use your equation for $L(x)$ to estimate $f(1.4)$.

(d) Do you think it is more likely that this is an overestimate or an underestimate? How come?