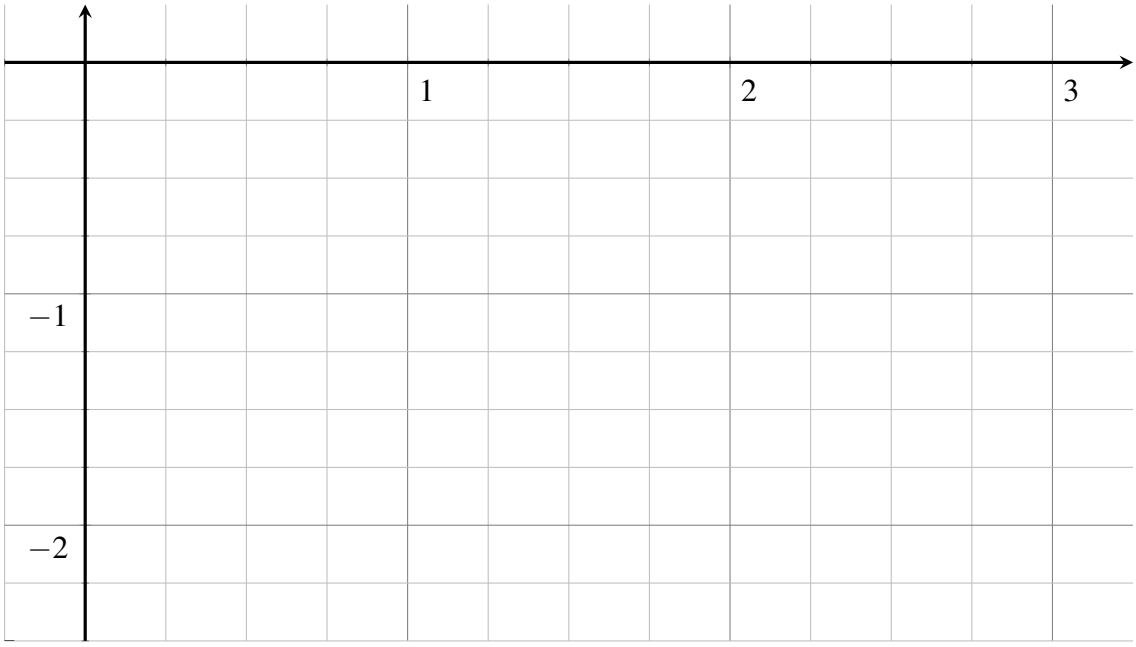
Chapter 1 checkpoint!

Learning target DF1, version 1

Suppose that you know the following values of some function $g(x)$:

x	1.7	2	2.3
$g(x)$	-2.2	-2	-1.5

1. Plot these points and sketch a plausible graph of $g(x)$.



2. On your graph above, draw a plausible tangent line to the graph of $g(x)$ at $x = 2$.

3. Use a central difference to estimate $g'(2)$. Draw the corresponding secant line on your graph above.

4. Compute another estimate of $g'(2)$. Draw the corresponding secant line on your graph above.

5. Which one of your approximations is the best? How do you know?

Learning target DF2, version 1

Suppose that $f(x) = 3x^2 - 5x + 4$.

1. Use the limit definition of the derivative to find $f'(x)$. **No shortcut rules!**

2. Evaluate at $x = 8$.

3. (Bonus!) What happens to the 3? What about the -5? And the 4?

Learning target DFa, version 1

A company manufactures rope, and the total cost of producing r feet of rope is $C(r)$ dollars.

1. Suppose $C(2000) = 800$. Write a sentence explaining what this means, including units.

2. What are the units of $C'(r)$?

3. Suppose $C'(2000) = 0.35$. Write a sentence explaining what this means, including units.

4. Do you think $C'(3000)$ is greater than, equal to, or less than $C'(2000)$? Explain why.

Learning target DFb, version 1

Learning target AD2, version 1

Suppose that for some function $p(x)$, you know the following information:

- $p(-2) = 5$,
- $p'(-2) = 1.5$,
- $p''(x) < 0$ for x-values close to -2.

1. Explain and demonstrate how to find the linearization $L(x)$ of $p(x)$ at $x = -2$.

2. Explain and demonstrate how to estimate the value of $p(-2.03)$ using this linearization.

3. Is your estimate of $p(-2.03)$ greater than or less than the actual value? How do you know?

4. Sketch a possible graph of $p(x)$ and its linearization $L(x)$ nearby $x = -2$ to illustrate your findings. Label important points in your sketch with their coordinates.