Recitation #7 - 3.1 Introducing the Derivative

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Warm up: Let $f(x) = x^{\frac{1}{3}}$. Which of the following are true:

(a) The graph of $f(x)$ has a tangent line at $x = 0$.

(b) The derivative $f'(0)$ is defined.

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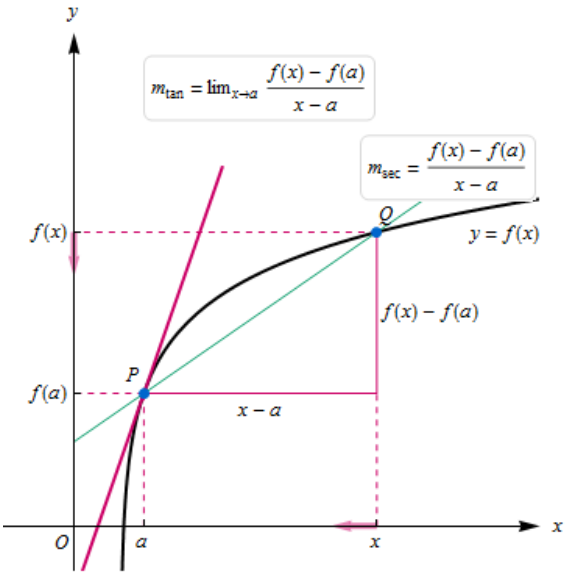
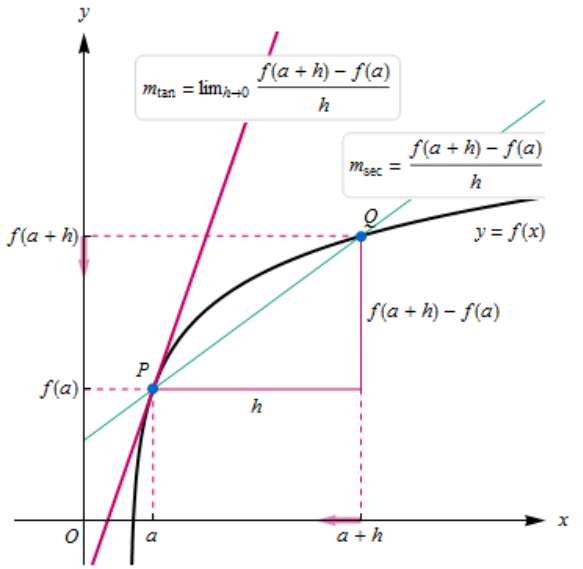
Group work:

Problem 1 *Discuss the similarities and differences between the two graphs below. Why are the notations different? Which are the secant lines? Which are the tangent lines? What are these graphs trying to communicate?*





Problem 2 *Find the equation of the tangent line to the graph of the given function at* $x = 3$.

(a) $f(x) = -5x^2 + 7x - 9$

(b) $f(x) = \sqrt{5x - 4}$

(c) $f(x) = \dfrac{x}{x - 5}$

Problem 3 *Let* $f(x) = |5 - x|$.

(a) *For* $a < 5$, *find* $f'(a)$.

(b) *For* $a > 5$, *find* $f'(a)$.

(c) *Use your work from parts (a) and (b) to answer the question "Does* $f'(5)$ *exist and, if so, what is* $f'(5)$*?".*
