1. Last class you showed that if $f(x) = 1/x$ then $f'(x) = -1/x^2$.

Find the equation of the tangent line to the curve $y = 1/x$ at $x = 2$ and at $x = 4$. Then sketch the graph of $y = 1/x$ and the two tangent lines.

$f(x) = \frac{1}{x}$

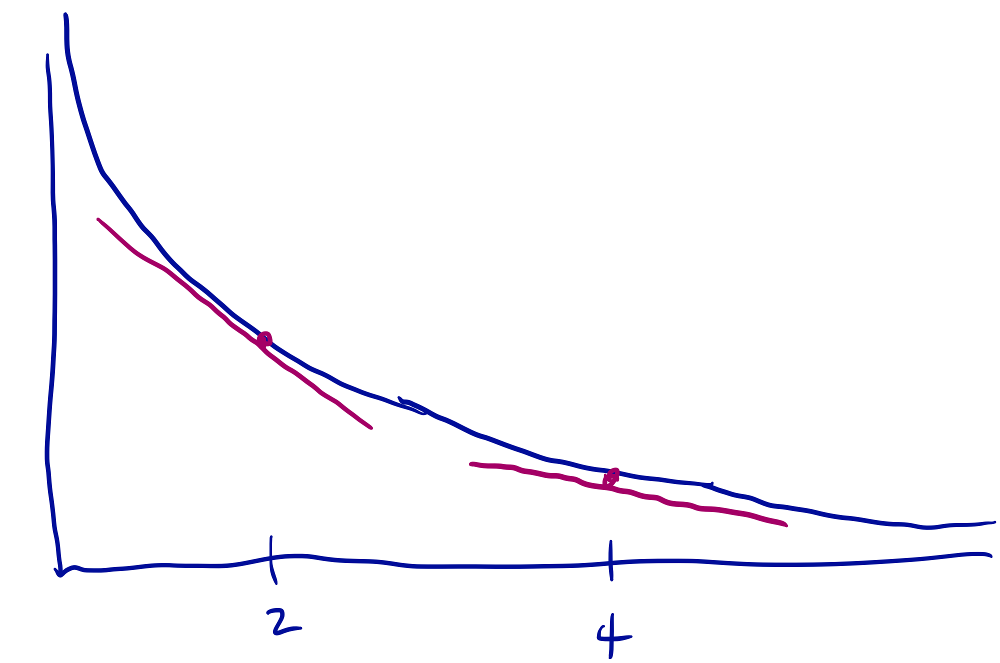
$f'(x) = \frac{-1}{x^2}$

@ $x = 2$ $\quad f(2) = 1/2$ $\quad y = \frac{1}{2} - \frac{1}{4}(x-2)$

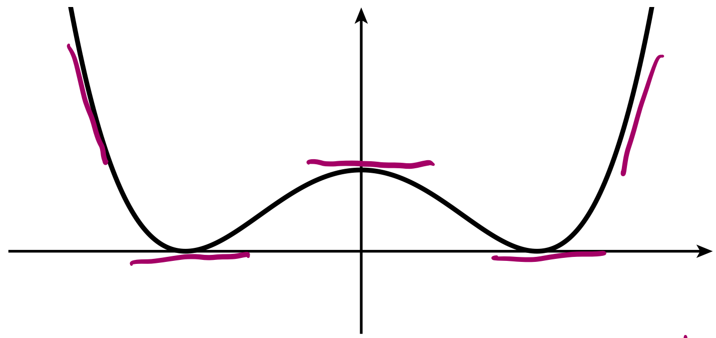
$f'(2) = -\frac{1}{4}$

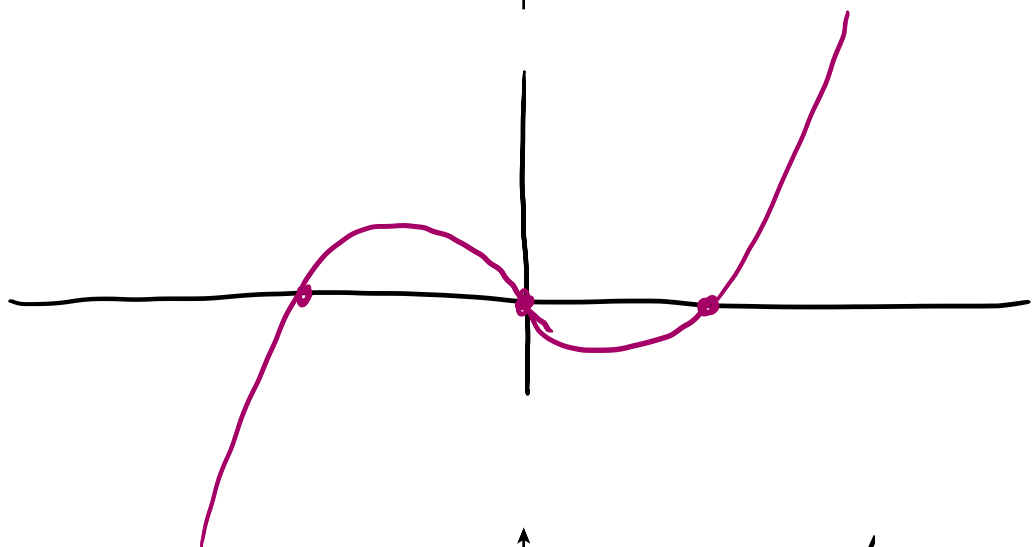
@ $x = 4$ $\quad f(4) = \frac{1}{4}$

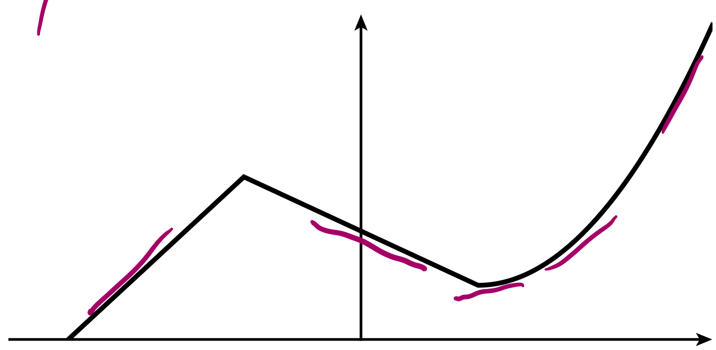
$f'(4) = \frac{-1}{16}$ $\quad y = \frac{1}{4} - \frac{1}{16}(x-4)$

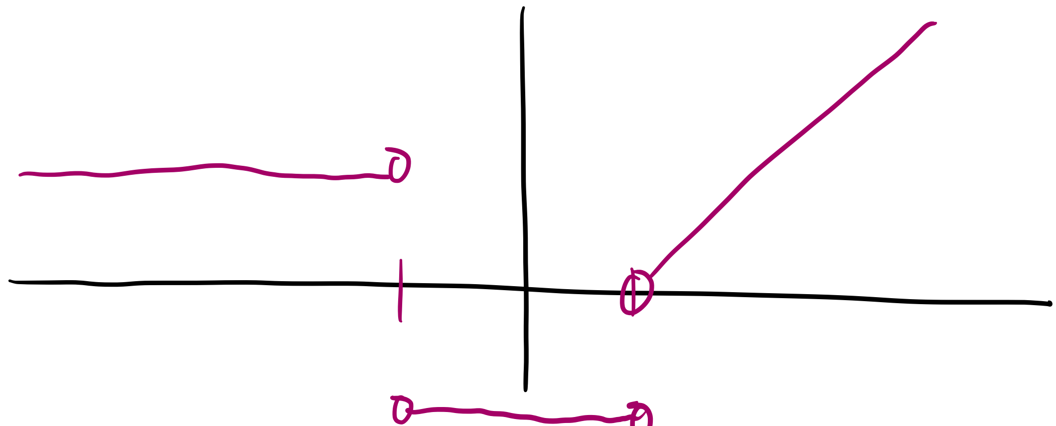


2. Given the graph of $f(x)$ below, sketch $f'(x)$.

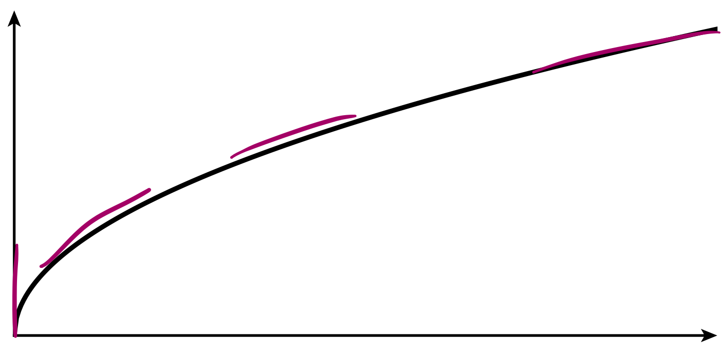


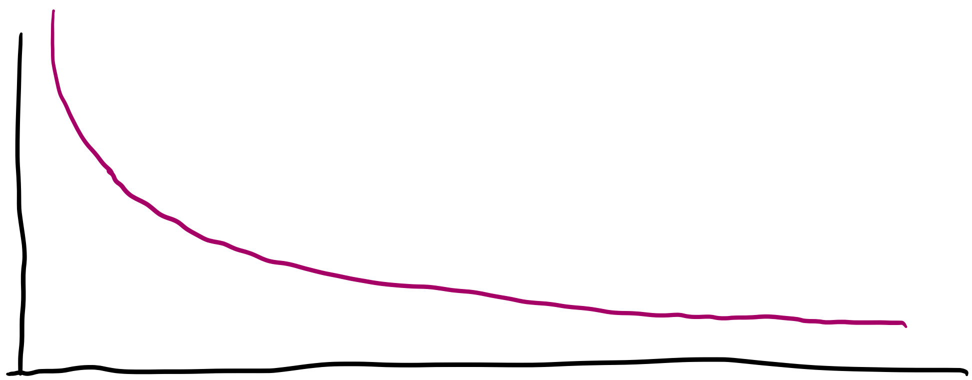






3. The graph below is $f(x) = \sqrt{x}$. Sketch $f'(x)$.





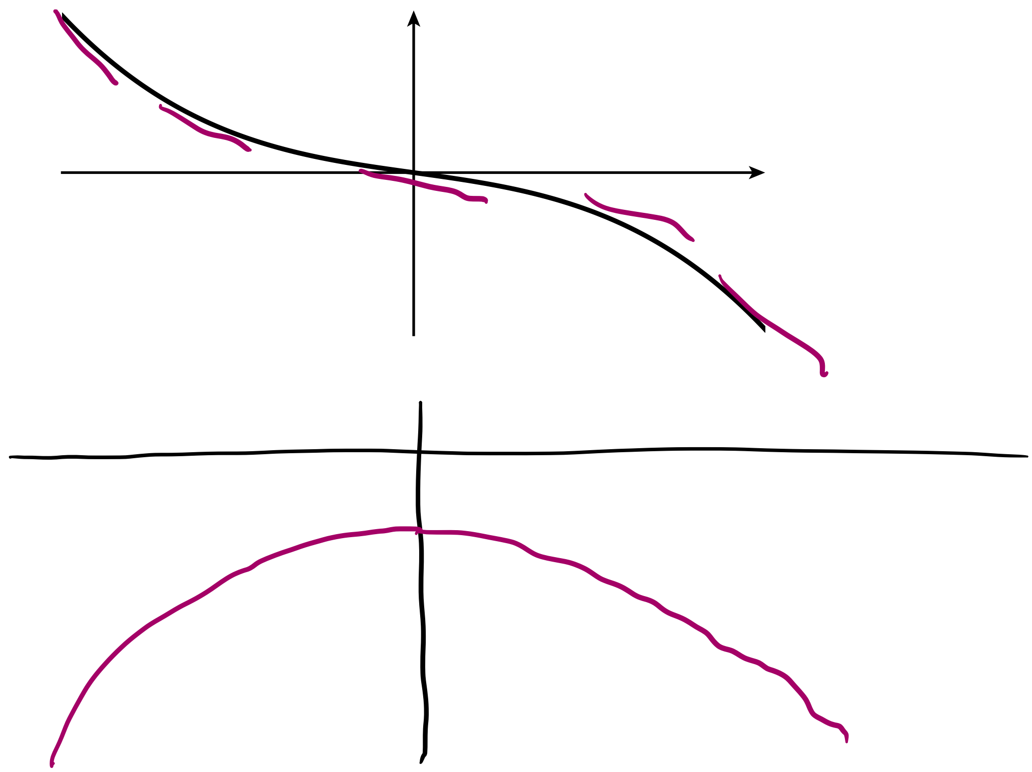
4. From the definition of the derivative, compute $f'(x)$ when $f(x) = \sqrt{x}$. Does your result agree with you sketch above?

$$f'(x) = \lim_{h\to 0} \frac{\sqrt{x+h} - \sqrt{x}}{h}$$

$$= \lim_{h\to 0} \frac{\sqrt{x+h} - \sqrt{x}}{h} \frac{\sqrt{x+h}+\sqrt{x}}{\sqrt{x+h}+\sqrt{x}}$$

$$= \lim_{h\to 0} \frac{h}{h(\sqrt{x+h}+\sqrt{x})} = \lim_{h\to 0} \frac{1}{\sqrt{x+h}+\sqrt{x}} = \frac{1}{\sqrt{x}+\sqrt{x}} = \frac{1}{2\sqrt{x}}$$

5. Given the graph of $f(x)$ below, sketch $f'(x)$.



6. Given the graph of $f(x)$ below, sketch $f'(x)$.