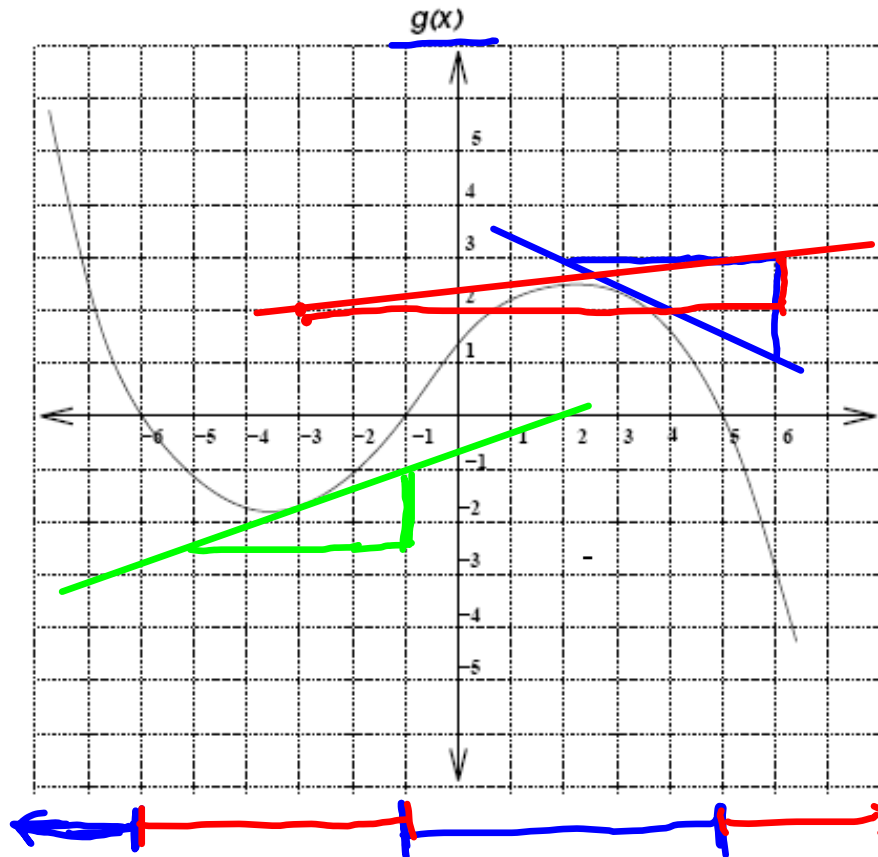


1. Use the graph of $g(x)$ to answer these questions.

Week in Review # 4
Section 2.1



(a) Where is $g(x)$ positive?

$$x < -6 \text{ and } -1 < x < 5$$

(b) Where is $g(x)$ negative?

$$-6 < x < -1 \text{ and } x > 5$$

(c) Estimate $g'(3)$.

$$g'(3) \approx \frac{-2}{4} = -\frac{1}{2}$$

rise
run

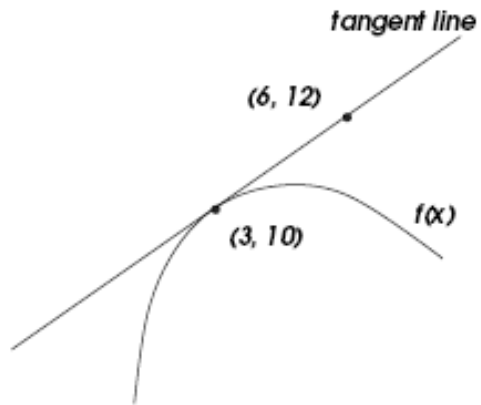
(d) Estimate $g'(2)$.

$$g'(2) \approx \frac{1}{9}$$

(e) Estimate ~~$g'(4)$~~ $g'(-3)$

$$g'(-3) \approx \frac{1.5}{4} \approx .375$$

2. Use the graph of $f(x)$ to fill in these blanks.

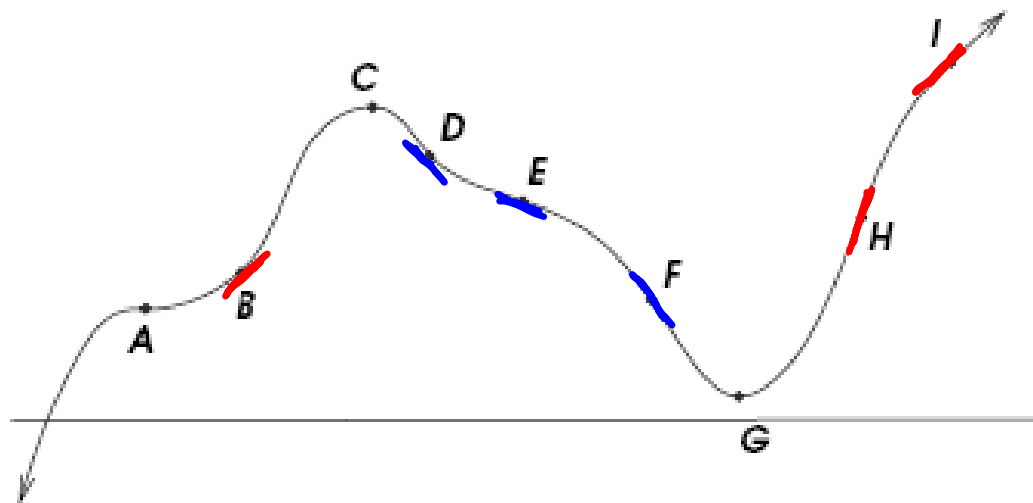


$$f(\underline{3}) = \underline{10}$$

$$f'(\underline{3}) = \underline{\frac{2}{3}}$$

$$M_{\text{tan}} = \frac{12 - 10}{6 - 3} = \frac{2}{3}$$

3. Use the points on the graph to answer these questions.



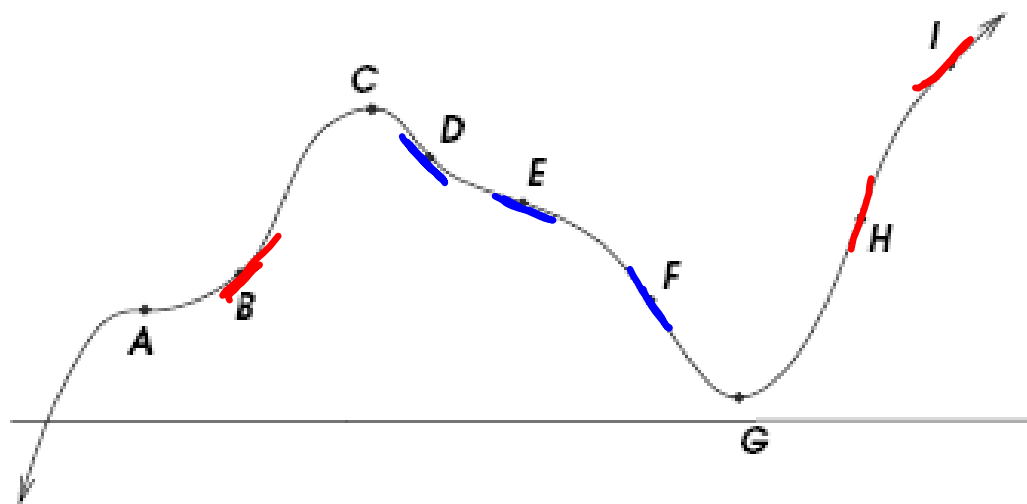
(a) At which points is the derivative zero?

C, G, A

horizontal tangent lines.

(b) At which points is the derivative positive?

B, H, I



(c) At which points is the derivative negative?

D, E, F

(d) At which point is the derivative the largest?

H

(e) At which point is the derivative the least?

F

4. Use the table to estimate the derivatives.

x	1	1.5	2	2.5	3	4	7	12	14
f(x)	1	3	6	8	12	14	25	32	42

(a) $f'(2) \approx \frac{8-6}{2.5-2} = \frac{2}{.5} = 4$ (forwards est.)

$\frac{6-3}{2-1.5} = \frac{3}{.5} = 6$ (Backwards est.)

Can avg. these. $\frac{6+4}{2} = 5$

(c) $f'(7) =$

Backwards points

are closer

$\frac{25-14}{7-4} = \frac{11}{3}$

(b) $f'(1) = \frac{3-1}{1.5-1} = \frac{2}{.5}$

$= 4$

(only forwards is possible)

(d) $f'(13) =$

$\frac{42-32}{14-12} = \frac{10}{2} = 5$

5. Estimate the derivative for $f(x) = x^x$ at $x = 2$ and at $x = 5$

$$x=2 \quad f(2) = 4$$

$$x=2.001 \quad f(2.001) = 4.006779$$

$$\begin{aligned} f'(2) &\approx \frac{f(2.001) - f(2)}{2.001 - 2} = \frac{4.006779 - 4}{.001} \\ &= \frac{.006779}{.001} = 6.779 \end{aligned}$$

$$x=5 \quad f(5) = 3125$$

$$x=5.001 \quad f(5.001) = 3133.165455$$

$$\begin{aligned} f'(5) &\approx \frac{f(5.001) - f(5)}{5.001 - 5} = \frac{3133.165455 - 3125}{.001} \\ &= \frac{8.165455}{.001} = 8165.455 \end{aligned}$$