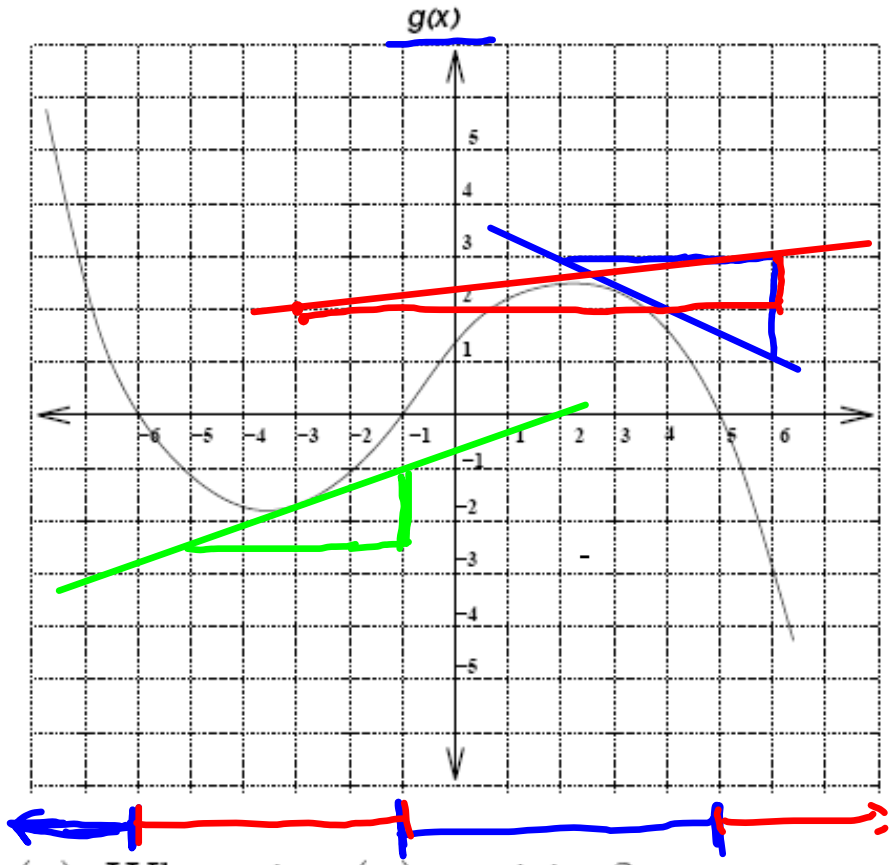
1. Use the graph of $g(x)$ to answer these questions.

Week in Review # 4
Section 2.1



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

$x < -6$ and $-1 < x < 5$

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

$-6 < x < -1$ and $x > 5$

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

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

$\frac{\text{rise}}{\text{run}}$

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

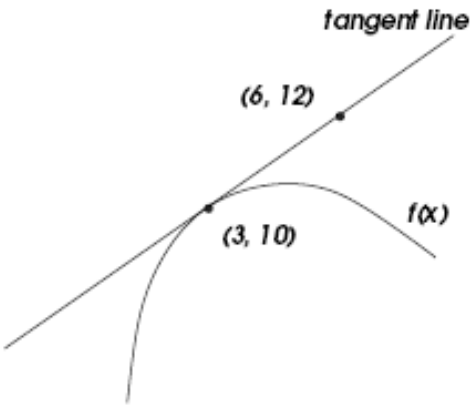
$g'(2) \approx \frac{1}{9}$

(e) Estimate ~~$g'(-1)$~~ $g'(-3)$

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

$\approx .375$

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

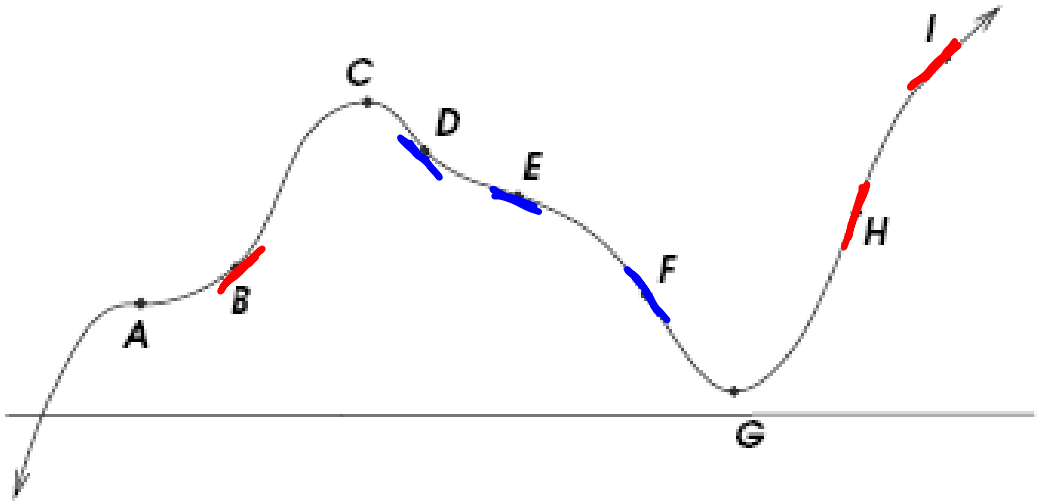


$f(\underline{3}) = \underline{10}$

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

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

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



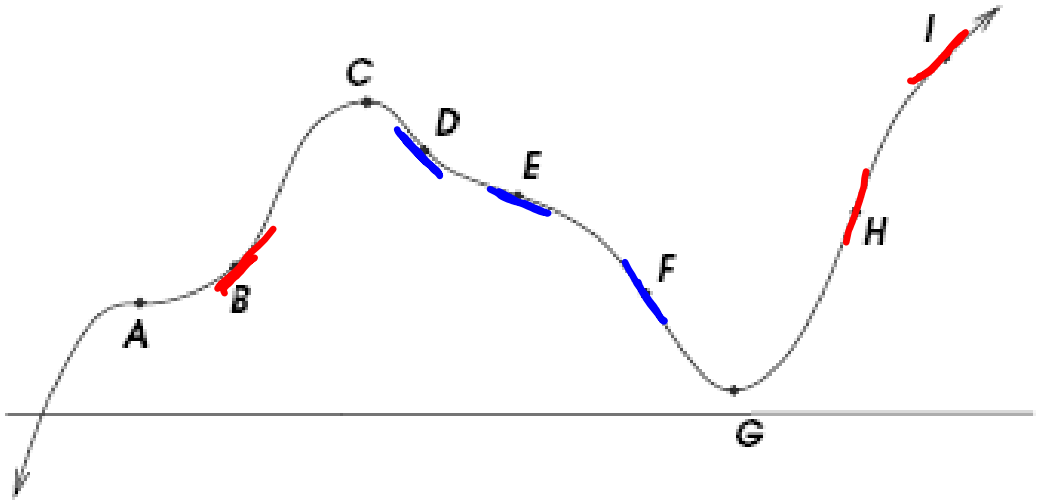
(a) At which points is the derivative zero?

horizontal tangent lines.

C, G, A

(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: $\frac{6+4}{2} = 5$

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

$= 4$

(only forwards is possible)

(c) $f'(7) =$

Backwards points are closer

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

(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 $x = 5$

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

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

$$f'(2) \approx \frac{f(2.001) - f(2)}{2.001 - 2} = \frac{4.006779 - 4}{.001}$$

$$= \frac{.006779}{.001} = 6.779$$

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

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

$$f'(5) \approx \frac{f(5.001) - f(5)}{5.001 - 5} = \frac{3133.165455 - 3125}{.001}$$

$$= \frac{8.165455}{.001} = 8165.455$$