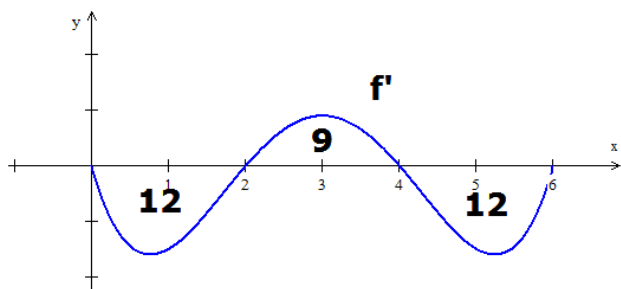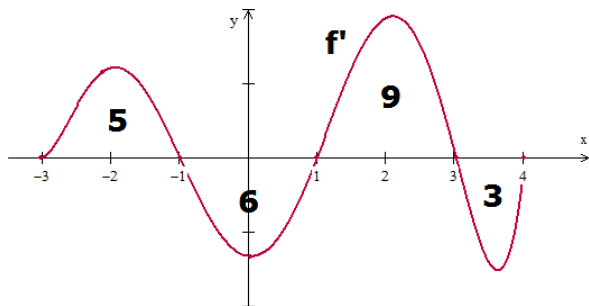**EXTREMA ON AN INTERVAL**
AP CALCULUS AB – HARTER
Find the maximum and minimum on the given interval. Justify your answer.
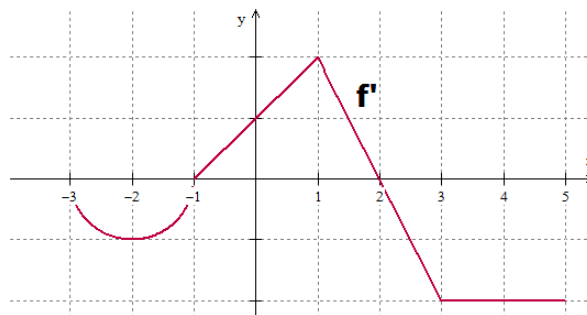
1. $f(x)=-x^2+2x+1$, $[0,4]$

2. $f(x)=\frac{1}{3}x-2\sqrt{x}$; $[1,16]$
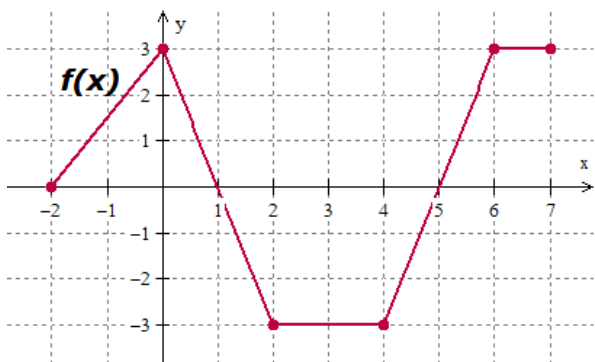
3. f' is graphed on the interval [-3,4] with the areas labeled as shown. If $f(1)=2$, find the maximum and minimum value of f(x) on [-3,4]. Justify your answer.

4. f' is graphed on the interval [0,6] with the areas labeled as shown. If $f(6)=8$, find the maximum and minimum value of f(x) on [0,6]. Justify your answer.
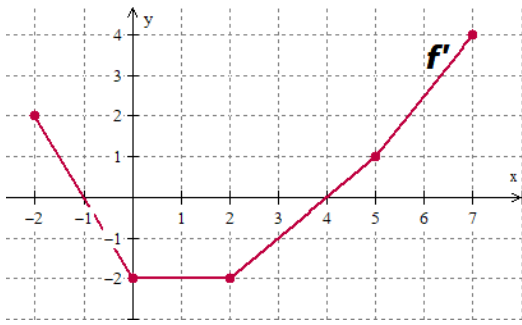

5. f' is graphed on the interval [-3,5]. If $f(0)=1$, find the maximum and minimum value of f(x) on [-3,5]. Justify your answer.

6. $h(x)=\int_{2}^{x}f(t)dt$ The graph of f is pictured. Find

    a. Find $h(-2)$ and $h(4)$
    b. Find $h'(2)$ and $h'(0)$
    c. Where is h concave up? JYA
    d. Where is h increasing? JYA
    e. Where is h decreasing AND concave down? JYA
    f. Name the maximum and minimum values of h on the interval [-2,7]. JYA.

7. f' is graphed on the interval [-2,7]. If $f(4)=5$, find the maximum and minimum value of f(x) on [-2,7]. Justify your answer.

8. $a(x)=\int_{8}^{x}f(t)dt$ The graph of f is pictured.

    a. Find $a(2)$ and $a(3)$

    b. Find $a'(2)$ and $a'(5)$

    c. Find $a''(2)$ and $a''(4)$

    d. Where is a increasing? JYA

    e. Name the maximum and minimum values of a(x) on the interval [0,8]. JYA.