What does $f'(x)$ and $f''(x)$ tell us about how the original function $f(x)$?

Graphical Approach

1. What does the slope of the tangent line tell me about the y-values of the original?

2. What does the first derivative, $f'(x)$,tell me about the original function?

A) If the first derivative is positive ($f'(x) > 0$),

B) If the first derivative is negative ($f'(x) < 0$),

C) If the first derivative is zero and changes from positive to negative around the zero,

D) If the first derivative is zero and changes from negative to positive around the zero,

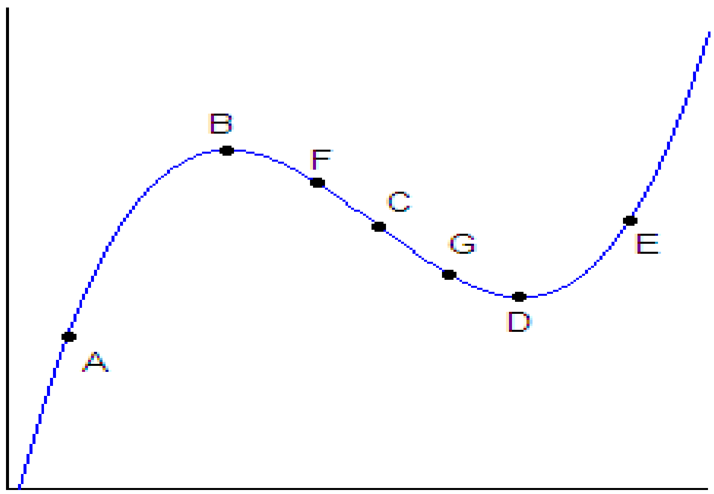
E) If the first derivative is zero and does not change signs around the zero,

3. What does the second derivative, $f''(x)$, tell me about the original function?

   A) If the second derivative is positive $f''(x) > 0$,

   B) If the second derivative is negative $f''(x) < 0$,

   C) If the second derivative is zero $f''(x) = 0$,



List the letters that correspond with each description

1. $f'(x) = 0$ ______

2. $f'(x) < 0$ ______

3. $f'(x) > 0$ ______

4. $f''(x) = 0$ ______

5. $f''(x) < 0$ ______

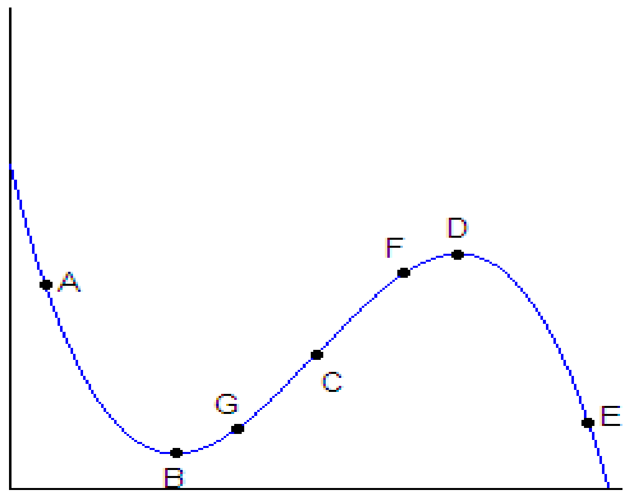
6. $f''(x) > 0$ ______

7. $f'(x) > 0 \ \ and \ \ f''(x) > 0$ _______

8. $f'(x) < 0 \ \ and \ \ f''(x) > 0$ _______

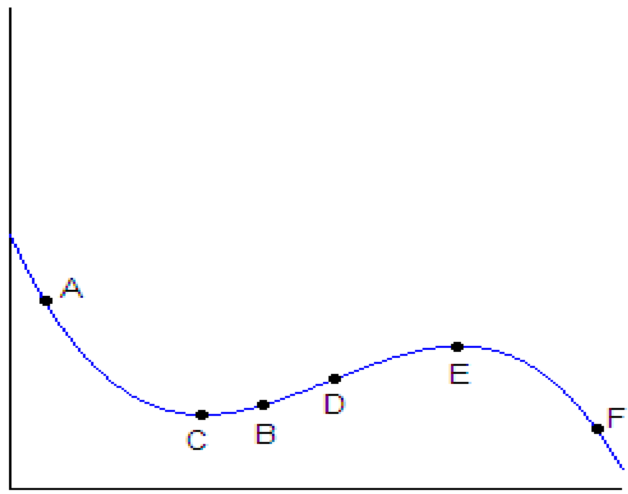
9. $f'(x) > 0 \ \ and \ \ f''(x) < 0$ _______

10. $f'(x) < 0 \ \ and \ \ f''(x) < 0$ _______



List the letters that correspond with each description

1. $f'(x)=0$ ______
2. $f'(x)<0$ ______
3. $f'(x)>0$ ______
4. $f''(x)=0$ ______
5. $f''(x)<0$ ______
6. $f''(x)>0$ ______
7. $f'(x)>0 \text{ and } f''(x)>0$ _______
8. $f'(x)<0 \text{ and } f''(x)>0$ _______
9. $f'(x)>0 \text{ and } f''(x)<0$ _______
10. $f'(x)<0 \text{ and } f''(x)<0$ _______



List the letters that correspond with each description

1. $f'(x) = 0$ ______
2. $f'(x) < 0$ ______
3. $f'(x) > 0$ ______
4. $f''(x) = 0$ ______
5. $f''(x) < 0$ ______
6. $f''(x) > 0$ ______
7. $f'(x) > 0 \ \ and \ \ f''(x) > 0$ _______
8. $f'(x) < 0 \ \ and \ \ f''(x) > 0$ _______
9. $f'(x) > 0 \ \ and \ \ f''(x) < 0$ _______
10. $f'(x) < 0 \ \ and \ \ f''(x) < 0$ _______