Section 3.3 - Optimization

1. For the following graph of *f* on the interval [1,5]:



* 1. Identify the value of x and *y* at
		1. The endpoints,
		2. The local maxima,
		3. The local minima,
		4. The points of inflection.
	2. Identify the value of x and *y* at the global max (largest value of *y* on the interval) and determine whether it occurs at an endpoint or a local max.
	3. Identify the value of x and *y* at the global min (smallest value of *y* on the interval) and determine whether it occurs at an endpoint or a local min.
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		1. The endpoints,
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	2. Identify the value of x and *y* at the global max (largest value of *y* on the interval) and determine whether it occurs at an endpoint or a local max.
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1. For the functions A-D below:
2. Find the formula of f’ and f’’.
3. Find the values of x where f’ and f’’ are equal to zero.
4. Create a numberline with the signs of f’ and f’’ as done in class
5. Find the points of inflection, local maxima and minima
6. Find the value of *f* at the interval endpoints
7. Determine the global max and global min
8. Draw the graph of *f* on the interval labeling the local and global max/min as well as the pts of inflection. (feel free to check with Desmos)
9. $f\left(x\right)=x^{3}-`12x+1$ on the interval [-4, 3]
10. $f\left(x\right)=\sin(\left(x\right))+cos⁡(x)$ on [0,2pi]
11. $f\left(x\right)=x^{3}-3x^{2}-9x$ on [-2,4]
12. $f\left(x\right)=xe^{-0.5x}$ on [-1,5]
13. The error function for a positioning algorithm is given by

$$f\left(h\right)=\frac{h^{3}}{3}-2h^{2}+3h+1$$

where *h* is the distance of the camera from an object and *f(h)* is the error in the position that the algorithm returns. Given that $0<h\leq 4$

1. What is the optimal distance for the camera?
2. What is the worst possible distance to place the camera?