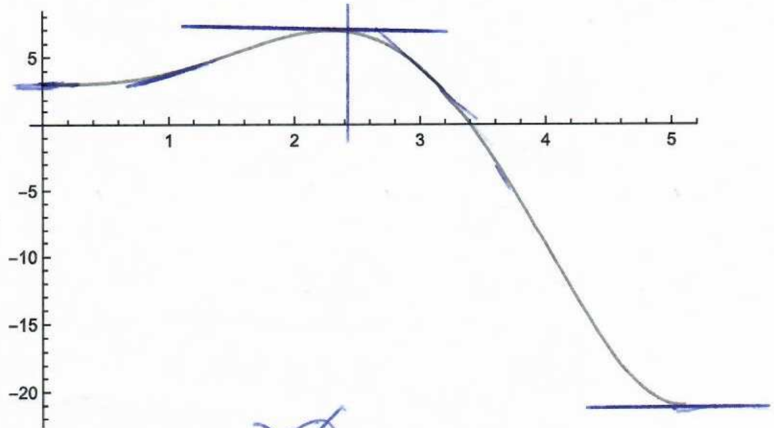
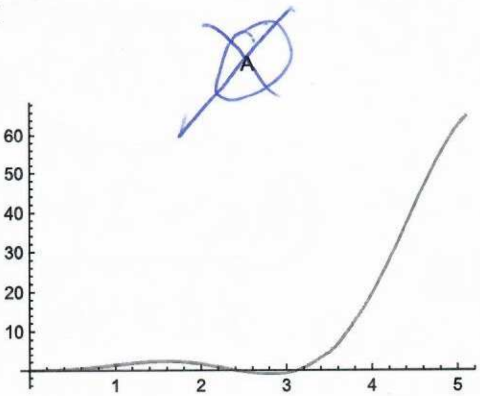
1. The graph of the function f is given on top; below are four potential derivatives:

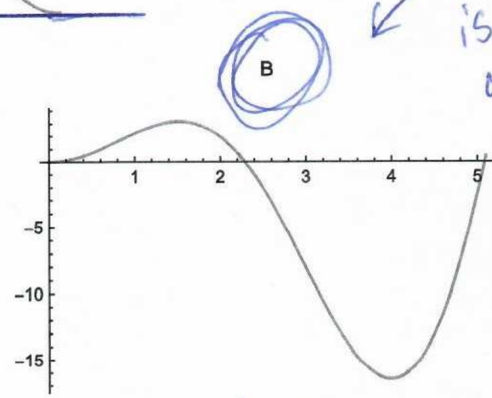
Out[5]=



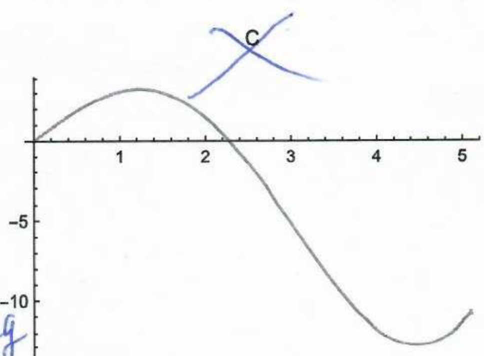
Good

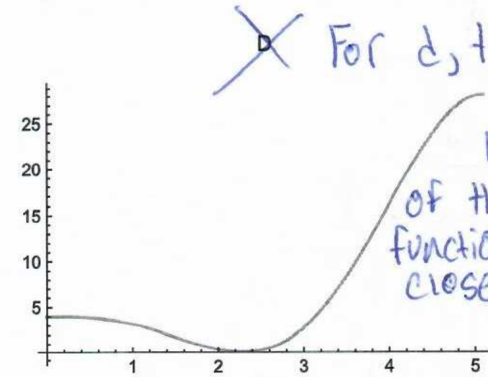
this one is cool with me





Out[6]=





I can exclude C because its graph stops at x=5 before reaching y=0, but we can see the graph flattens out for a slope of 0 at x=5.

For d, the graph starts too high, the slope of the actual function seems closer to 0

For three of A-D, explain how you can reject the graph (one is them is derivative). You might point out features on the graphs of those which you can reject (or make comments below.

A) I can exclude a for its end behavior. The functions slope near x=4 gets more negative until it begins approaching 0 whereas the graph of a becomes more positive.

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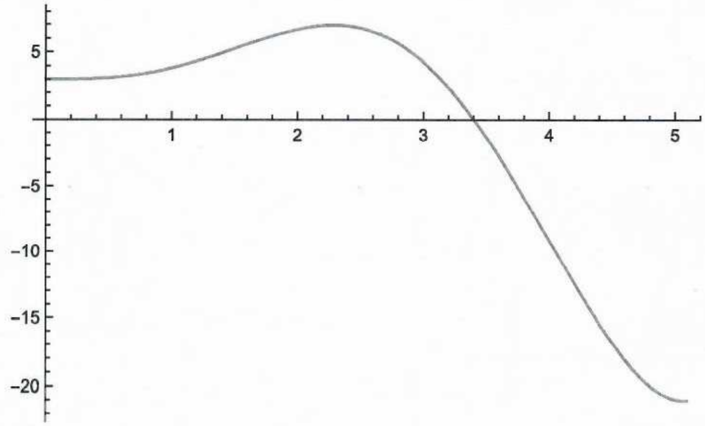

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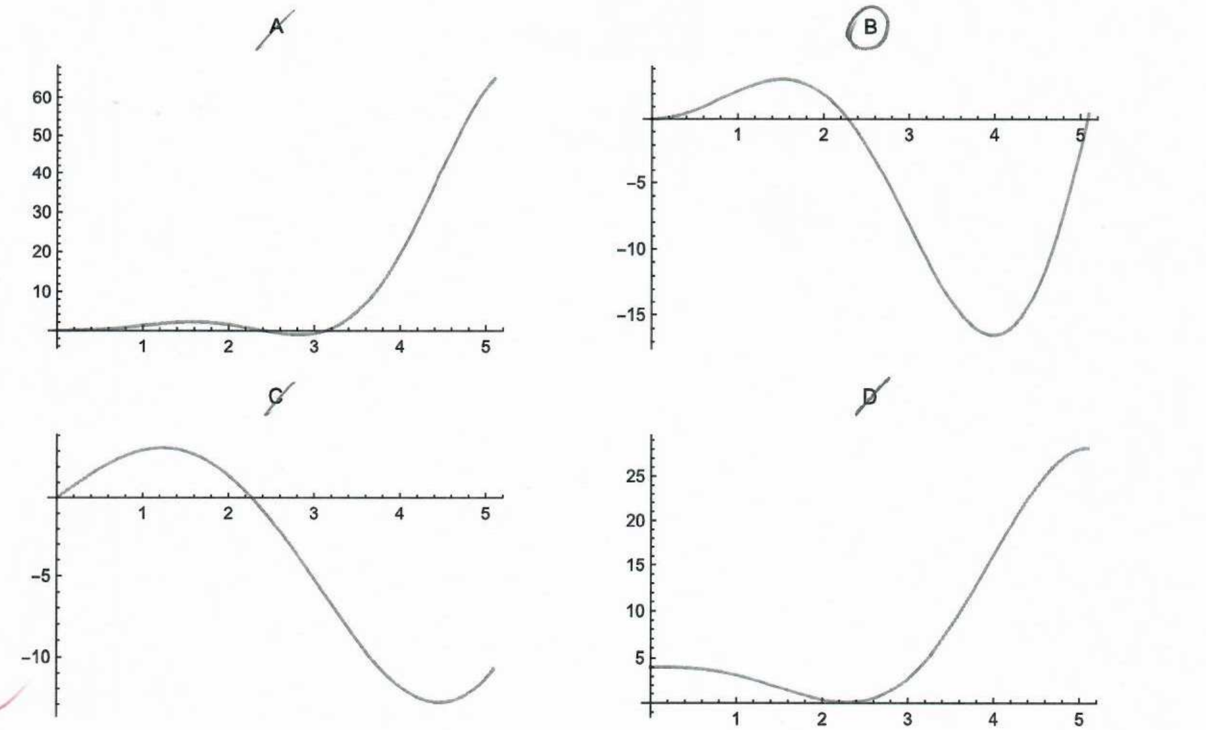


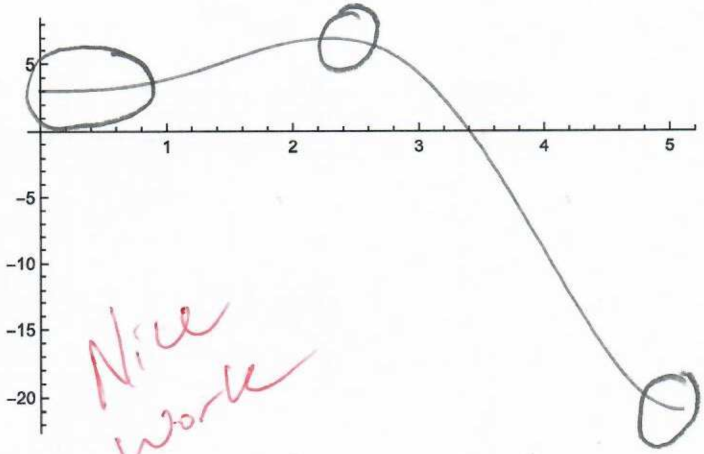
Good

For three of A-D, explain how you can reject the graph (one is them is derivative). You might point out features on the graphs of those which you can reject (or make comments below.

The derivative can't be d., since it never crosses the x-axis when the original function starts to decrease between 2 and 3, meaning the derivative must have a negative y-value at that point. It also can't be a., since the decrease in the original function would cause more values to be negative. Finally, it can't be c., since the original function reaches a tangent line with slope 0 at the end, which only b. shows.

1. The graph of the function f is given on top; below are four potential derivatives:

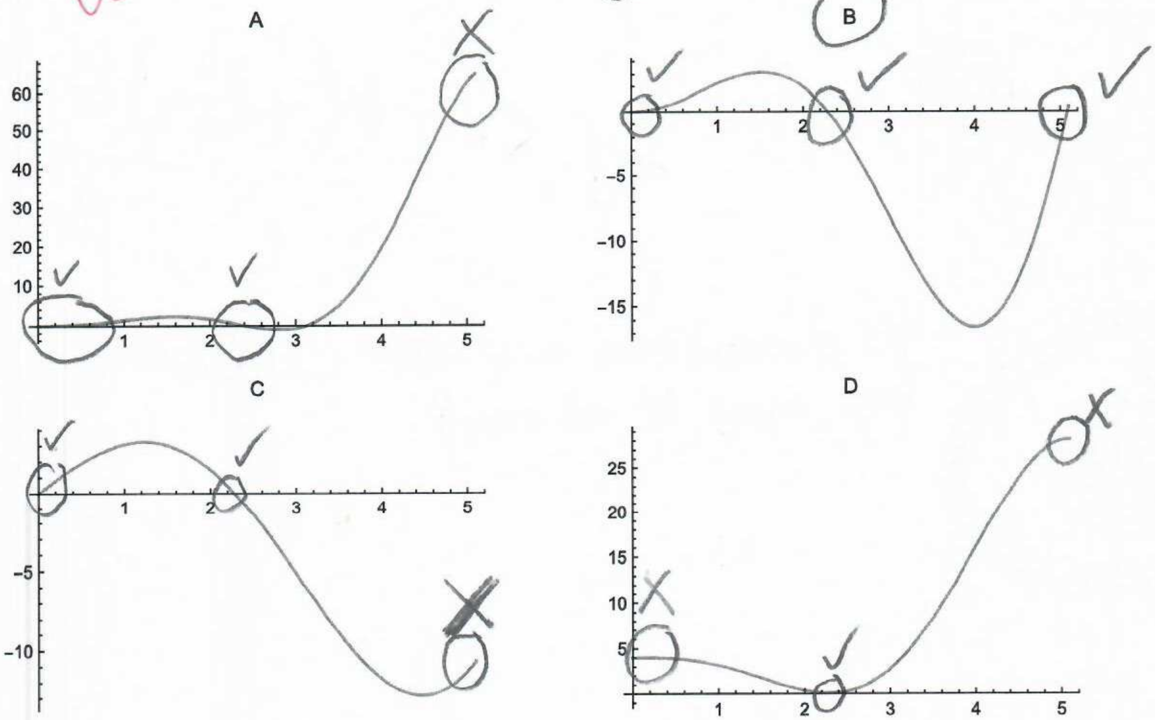
Out[5]=



All three of the circled spots should be at or near 0

B is the only graph that satisfies all 3 spots

Out[6]=



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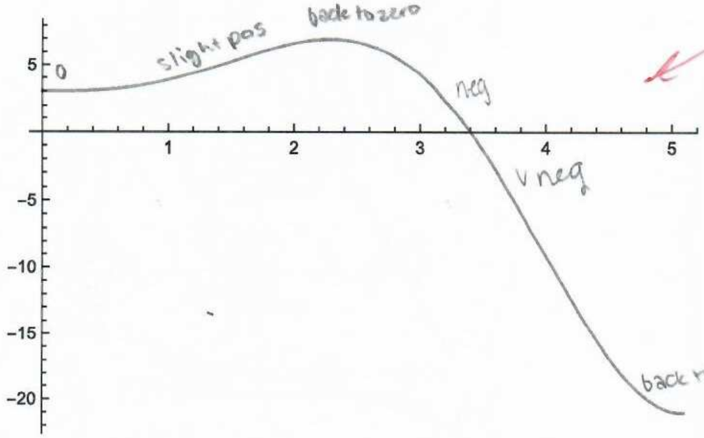
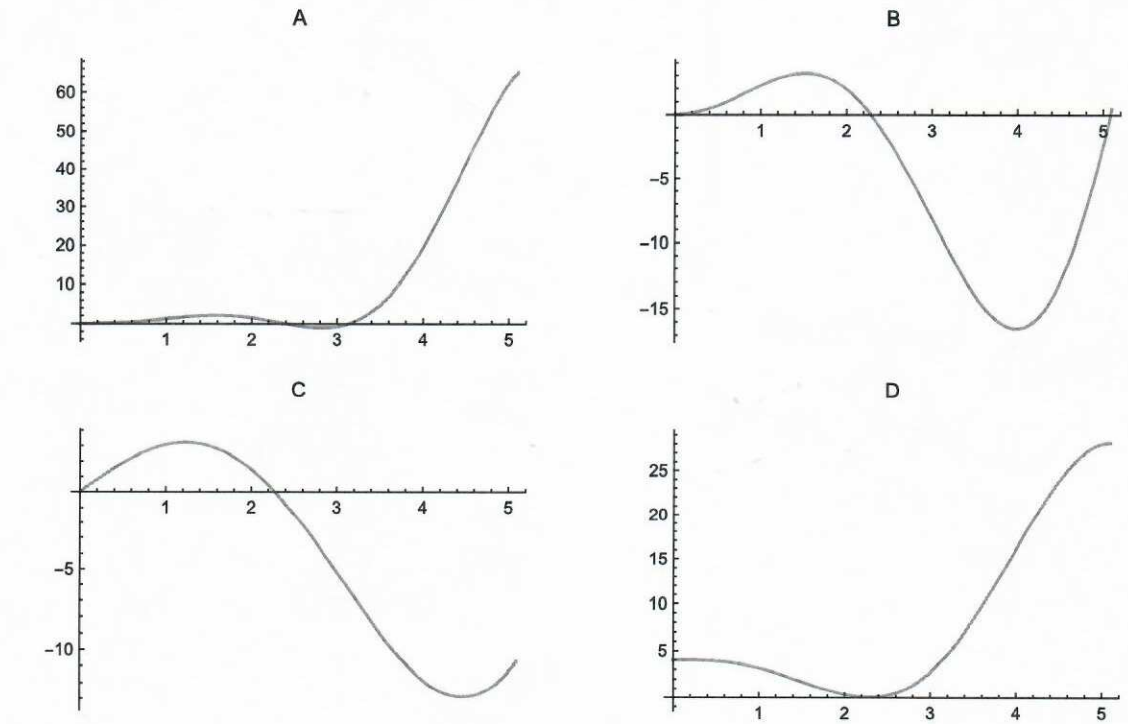


Nice work!

Out[6]=



For three of A-D, explain how you can reject the graph (one is them is derivative). You might point out features on the graphs of those which you can reject (or make comments below.

D → does not start @ 0, when the slope is 0 for the beginning

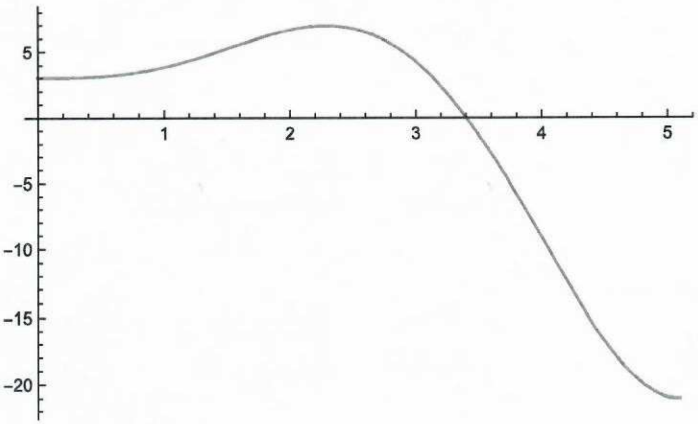
C → only has 2 points of 0, graph has 3-0 slopes

A → barely goes negative when slope gets very negative on graph

✓

1. The graph of the function f is given on top; below are four potential derivatives:

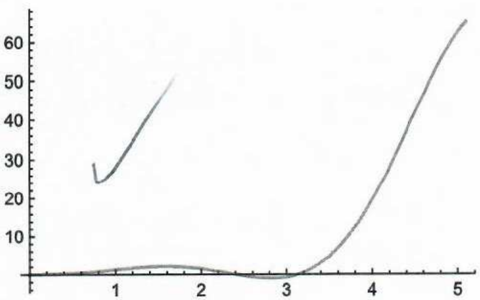
Out[5]=



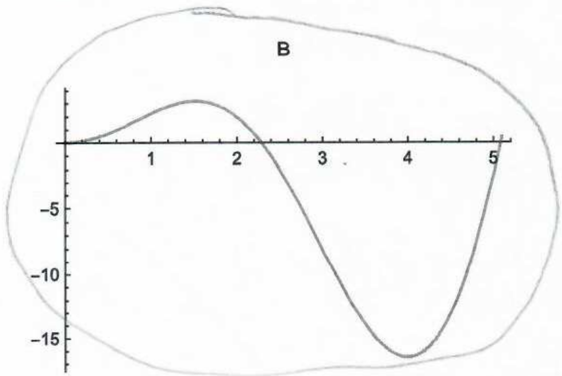
Nice work

A

The slope of the tan. line at $f(3)$ is relatively negative, not 0.



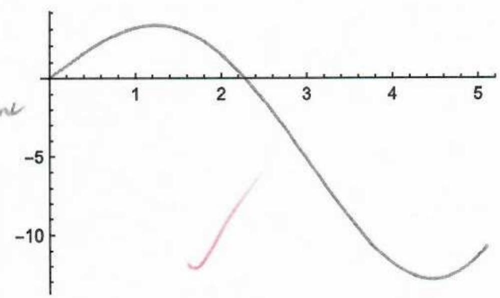
B



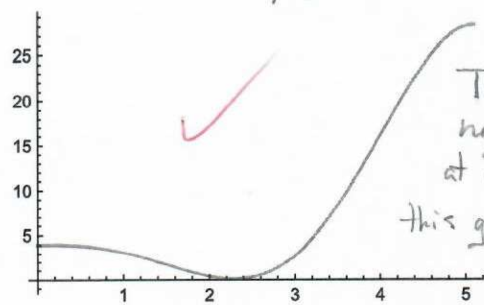
Out[6]=

C ✗

The slope of the tangent line a $f(5)$ is nearing 0.



D ✗



There is a negative slope at approximately 2, this graph does not show neg. slope anywhere

For three of A-D, explain how you can reject the graph (one is them is derivative). You might point out features on the graphs of those which you can reject (or make comments below.

2. Use the a limit definition of the derivative to compute the derivative of $f(x) = \frac{2}{x}$ (but use centered difference for full credit).

$$f'(a) = \lim_{h \to 0} \frac{f(a+h) - f(a-h)}{2h}$$

$$2x^{-1} = -2x^{-2} = \frac{-2}{x^2}$$

$$\lim_{h \to 0} \frac{\frac{2}{x+h} - \frac{2}{x-h}}{2h} \cdot \frac{(x+h)(x-h)}{(x+h)(x-h)} = \lim_{h \to 0} \frac{\cancel{2}(x-h) - \cancel{2}(x+h)}{\cancel{2}h(x^2-h^2)}$$

$$\lim_{h \to 0} \frac{-2\cancel{h}}{\cancel{h}(x^2-h^2)} = \lim_{h \to 0} \frac{-2}{x^2 - \cancel{h^2}} = \boxed{-\frac{2}{x^2}}$$

We don't cancel the h; but when we pass to the limit $(h \to 0)$ the h "vanishes".

Nice work

2. Use the a limit definition of the derivative to compute the derivative of $f(x) = \frac{2}{x}$ (but use centered difference for full credit).

Given : $f(x) = \frac{2}{x}$

good

$f(x+h) = \frac{2}{x+h}$ & $f(x-h) = \frac{2}{x-h}$

Now, using the formula of centered difference

$$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x-h)}{2h}$$

$$= \lim_{h \to 0} \frac{\frac{2}{x+h} - \frac{2}{x-h}}{2h}$$

$$= \lim_{h \to 0} \frac{\frac{\cancel{2x} - 2h - \cancel{2x} - 2h}{x^2 - h^2}}{2h}$$

well done

$$= \lim_{h \to 0} \frac{\frac{-4h}{x^2 - h^2}}{2h}$$

$$= \lim_{h \to 0} \frac{-4\cancel{h}}{(x^2 - h^2) \times 2\cancel{h}}$$

$$= \lim_{h \to 0} \frac{-2}{x^2 - h^2} = \frac{-2}{x^2}$$