

Handout: More Derivative Problems

Discussions 201, 203 // 2018-09-26

For all problems on this handout, f and g refer to the following two functions:

$$f = \frac{x^2}{2},$$
$$g = -(x - 1)^2.$$

Problem 1. Graph the functions f and g , preferably by transforming the graph of $y = x^2$ in appropriate ways.

Problem 2. Compute the derivatives f' and g' .

Problem 3. Find the equation of the line tangent to the graph of f at the point $(-4, 8)$, and then determine where this tangent line crosses the x -axis.

Problem 4. Is there a line tangent to the graph of f which passes through the point $(0, 1)$? How about the point $(1, 0)$?

The next question concerns both functions f and g .

Problem 5. Draw the graphs of f and g in the same picture, if you have not already done so. As you can see, the x -axis (i.e. the line $y = 0$) is tangent to both graphs.

There is another line which is tangent to both graphs. Find its equation.

There was originally another problem on this handout, but it was actually impossible to solve, so I have removed it.