MATH 252 (PHILLIPS): EXTRA PROBLEMS SIMILAR TO WRITTEN HOMEWORK 1.

This is a collection of extra problems of the same type as found in Written Homework 1. It is intended for practice. It is not to be turned in, and will not count towards the course grade, but I will be happy to answer questions about it.

1. (6 points.) Suppose you are given a function $h$, and you know a function $H$ such that $H'(x) = -f(x)$ for all real $x$. In terms of $H$, find all antiderivatives of the function $-81f(x) + 26x$.
   In this problem, “showing your work” means showing that your supposed antiderivatives really have the right derivative.

2. (6 points.) Suppose you are given a function $w$, and you know a function $W$ such that $W'(x) = w(x)$ for all real $x$. In terms of $W$, find all antiderivatives of the function $g(32x)$.
   In this problem, “showing your work” means showing that your supposed antiderivatives really have the right derivative.
   Hint: The expression $W(32x)$ should appear in your answer.

3. (6 points.) Suppose you know a function $Q$ such that $Q'(x) = \arctan(e^{x^2})$ for all real $x$. In terms of $F$, find all antiderivatives of the function $-11\arctan(e^{x^2})$.
   In this problem, “showing your work” means showing that your supposed antiderivatives really have the right derivative.

4. (6 points.) Suppose you know a function $R$ such that $R'(x) = \sqrt{e^{x^2}+4}$ for all real $x$. In terms of $R$, find all antiderivatives of the function $x^2\sqrt{e^{x^2}+4}$.
   In this problem, “showing your work” means showing that your supposed antiderivatives really have the right derivative.
   Hint: The expression $R(x^3)$ should appear in your answer.

Date: 7 January 2021.