1. (Review) Find the $y^{\prime}$ by using implicit differentiation for $2 y^{3}+4 x^{2}-y=x^{6}$.

Recall the two parts of the Fundamental Theorem of Calculus:
Theorem. Suppose $f$ is continuous on $[a, b]$. If $x$ is in $(a, b)$, then

$$
\frac{d}{d x} \int_{a}^{x} f(t) d t=f(x)
$$

Theorem. Suppose $f$ is continuous on $[a, b]$. If $F$ is an antiderivative of $f$, then

$$
\int_{a}^{b} f(x) d x=F(b)-F(a)
$$

2. Evaluate the following:
(a) $\frac{d}{d x} \int_{2}^{x} \frac{\cos \left(t^{2}\right) t^{t}}{t+\sin \left(e^{t}\right)} d t$
(b) $\frac{d}{d x} \int_{2}^{e^{x}} 3 t^{2} e^{\sin (t)} d t$
3. Evaluate the following definite integrals:
(a) $\int_{0}^{2} x^{2}(3-4 x) d x$
(b) $\int_{3}^{2} e^{x}+\frac{1}{x^{2}+1} d x$
(c) $\int_{3}^{6}|2 x-10| d x$
4. Suppose that $\int_{0}^{6} f(x) d x=3$ and $\int_{3}^{0} 2 f(x) d x=1$. What is $\int_{3}^{6} f(x)-1 d x$ ?
5. Consider the following three integrals:

$$
\int_{a}^{b} f(x) d x \quad \int_{a}^{b}|f(x)| d x \quad\left|\int_{a}^{b} f(x) d x\right|
$$

What order should they be in so that they are increasing? (i.e., fill in the blanks of the following)
$\qquad$

