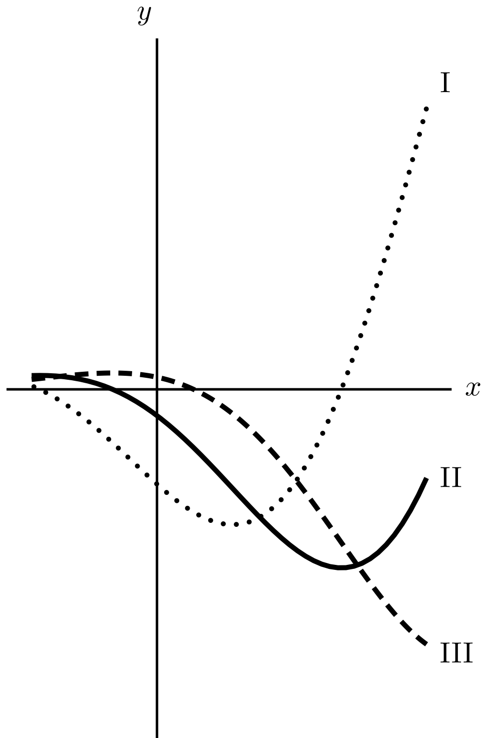
10. [5 points] Shown on the axes below are the graphs of $y = f(x)$, $y = f'(x)$, and $y = f''(x)$.



Determine which graph is which and circle the ONE correct response below.

- i. • $f(x)$: I, $f'(x)$: II, and $f''(x)$: III
- ii. • $f(x)$: I, $f'(x)$: III, and $f''(x)$: II
- iii. • $f(x)$: II, $f'(x)$: I, and $f''(x)$: III
- iv. • $f(x)$: II, $f'(x)$: III, and $f''(x)$: I
- v. • $f(x)$: III, $f'(x)$: I, and $f''(x)$: II
- vi. • $f(x)$: III, $f'(x)$: II, and $f''(x)$: I

11. [4 points] Suppose w and r are continuous functions on $(-\infty, \infty)$, $W(x)$ is an invertible antiderivative of $w(x)$, and $R(x)$ is an antiderivative of $r(x)$.
Circle all of the statements I-VI below that must be true.
If none of the statements must be true, circle NONE OF THESE.

I. $W(x) + R(x) + 2$ is an antiderivative of $w(x) + r(x)$.

II. $W(x) + R(x)$ is an antiderivative of $w(x) + r(x) + 2$.

III. $\cos(W(x))$ is an antiderivative of $\sin(w(x))$.

IV. $e^{W(x)}$ is an antiderivative of $w(x)e^{w(x)}$.

V. $e^{R(x)}$ is an antiderivative of $r(x)e^{R(x)}$.

VI. If w is never zero, then $W^{-1}(R(x))$ is an antiderivative of $\dfrac{r(x)}{w(W^{-1}(R(x)))}$.

Solution: To see that VI is true, we check that

$$\frac{d}{dx}\left(W^{-1}(R(x))\right) = R'(x)\frac{1}{W'(W^{-1}(R(x)))} = \frac{r(x)}{w(W^{-1}(R(x)))}.$$

VII. NONE OF THESE