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 <u>ONE</u> 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): I, 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 <u>all</u> of the statements I-VI below that <u>must</u> 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  $\frac{r(x)}{w(W^{-1}(R(x)))}$ .

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