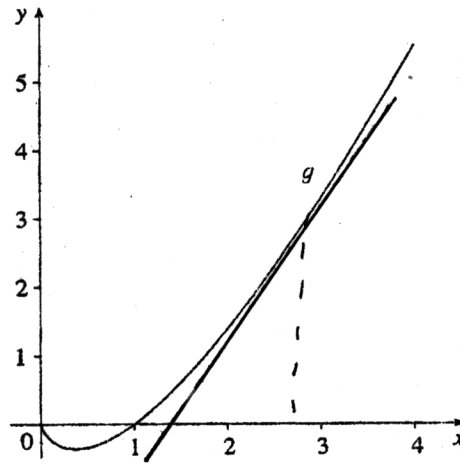


**Group Work 1, Section 2.8**  
**Tangent Lines and the Derivative Function**

The following is a graph of  $g(x) = x \ln x$ .



It is a fact that the derivative of this function is  $g'(x) = \ln x + 1$ .

1. Sketch the line tangent to  $g(x)$  at  $x = e \approx 2.718$  on the graph above.
2. Find an equation of the tangent line at  $x = e$ .

at  $x = e$   $g(e) = e \ln e = e$  and  $m = \ln(e) + 1 = 2$

$$y - e = 2(x - e)$$

$$y = 2x - 2e + e = 2x - e \quad \boxed{y = 2x - e}$$

3. Now sketch the line tangent to  $g(x)$  at  $x = \frac{1}{e} \approx 0.368$ .

4. Find an equation of the tangent line at  $x = \frac{1}{e}$ .

at  $x = \frac{1}{e}$   $g\left(\frac{1}{e}\right) = \frac{1}{e} \ln\left(\frac{1}{e}\right) = -\frac{1}{e}$  and  $g'\left(\frac{1}{e}\right) = \ln\left(\frac{1}{e}\right) + 1 = 0$   
 $m = 0$

$$y - \frac{1}{e} = 0\left(x - \frac{1}{e}\right)$$

$$\boxed{y = -\frac{1}{e}}$$

**Group Work 4, Section 2.8**  
**Sorting Them Out (Version A)**

Each figure below shows the graphs of a function, its first derivative, and its second derivative. Identify which is which.

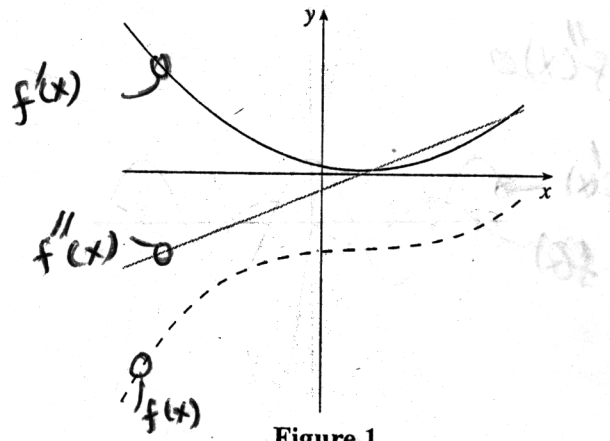


Figure 1

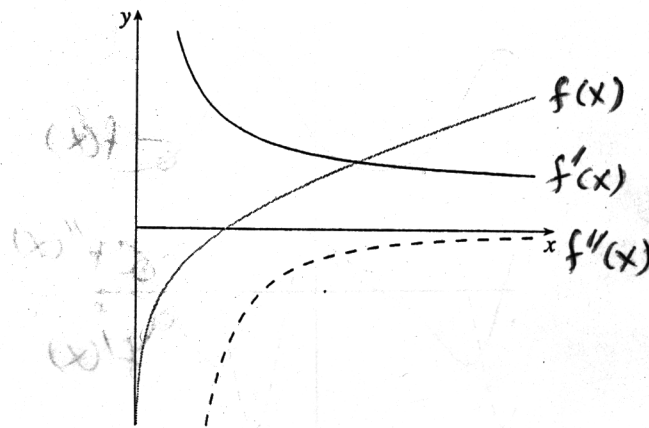


Figure 2

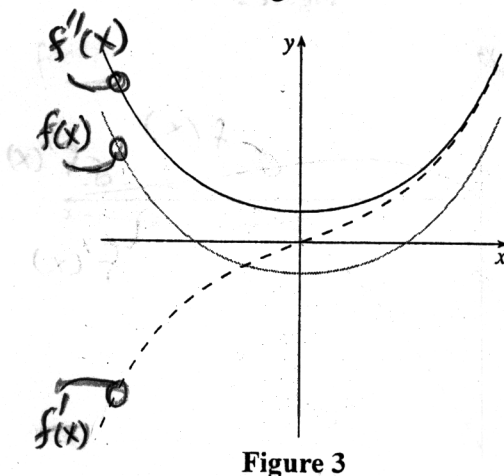
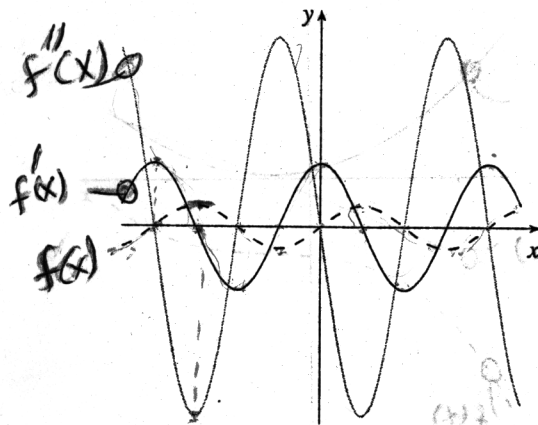


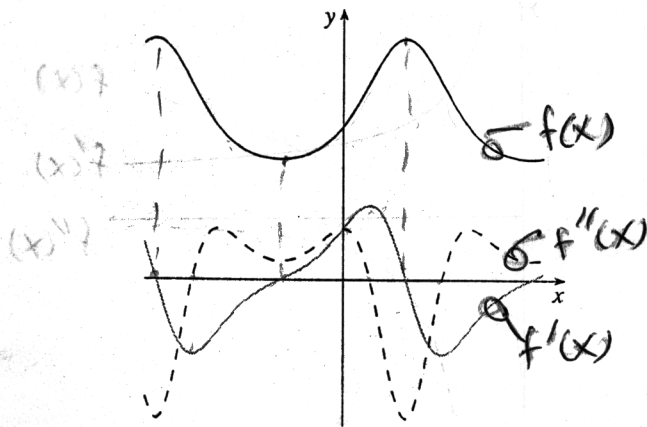
Figure 3

**Group Work 4, Section 2.8**  
**Sorting Them Out (Version B)**

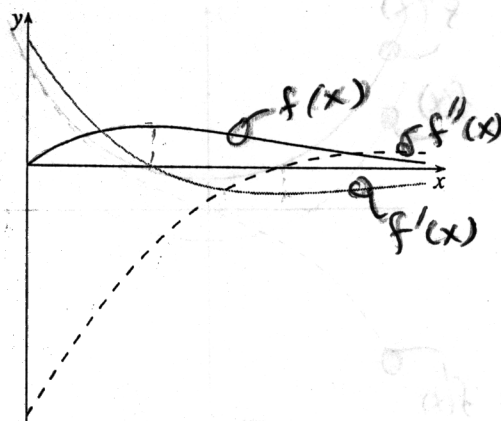
Each figure below shows the graphs of a function, its first derivative, and its second derivative. Identify which is which.



**Figure 1**



**Figure 2**



**Figure 3**