

1) Differentiate:

(a) $f(x) = \frac{e^{2x}}{\cos x}$

(b) $f(x) = \sqrt{3x-1} \ln(x)$

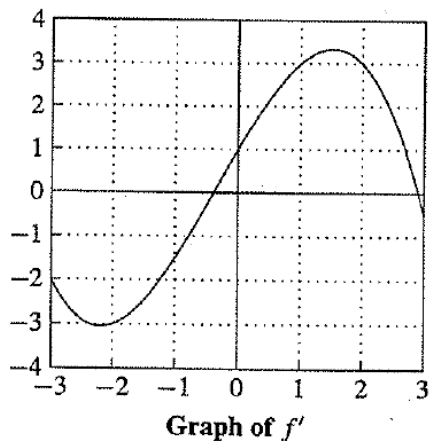
(c) $f(x) = \sin(e^{x^2-1})$

(d) $f(x) = \sqrt{x^2 e^x}$

2) Find the following limit by recognizing the form. Explain how you arrived at your answer.

$$\lim_{h \rightarrow 0} \frac{\frac{\sin(\frac{\pi}{4} + h)}{\cos(\frac{\pi}{4} + h)} - (1)}{h}$$

3) Suppose that $f(0) = 3$ and the graph f' is shown below. Let $g(x) = e^x f(x)$.



a. Evaluate $g'(0)$.

b. Is g increasing at $x = 1$? at $x = 2$? Justify your answers

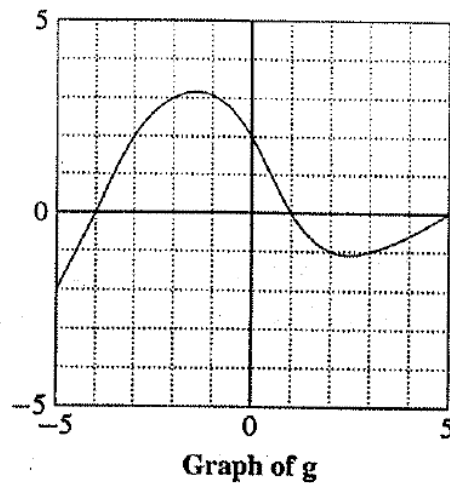
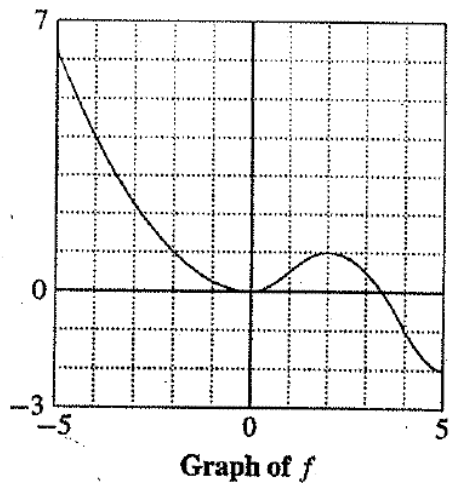
c. Estimate $g''(0)$.

d. Is g concave up at $x = 1$? at $x = 2$? Justify your answers.

- 4) Given that $h(x) = f(x) \cdot g(x)$ and $j(x) = \frac{f(x)}{g(x)}$, complete the table below.

x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$	$h'(x)$	$j'(x)$
-2	1	-1	-3	4		-1/9
-1	0	-2	1	1	-2	
0	-1	2	-2	1		
1	2	-2	-1	2	6	
2	3	-1	2	-2		1

- 5) Let $h(x) = (f \circ g)(x)$ where f and g are functions defined by the graphs below.



Evaluate $h(-2)$, $h(1)$, and $h(3)$.