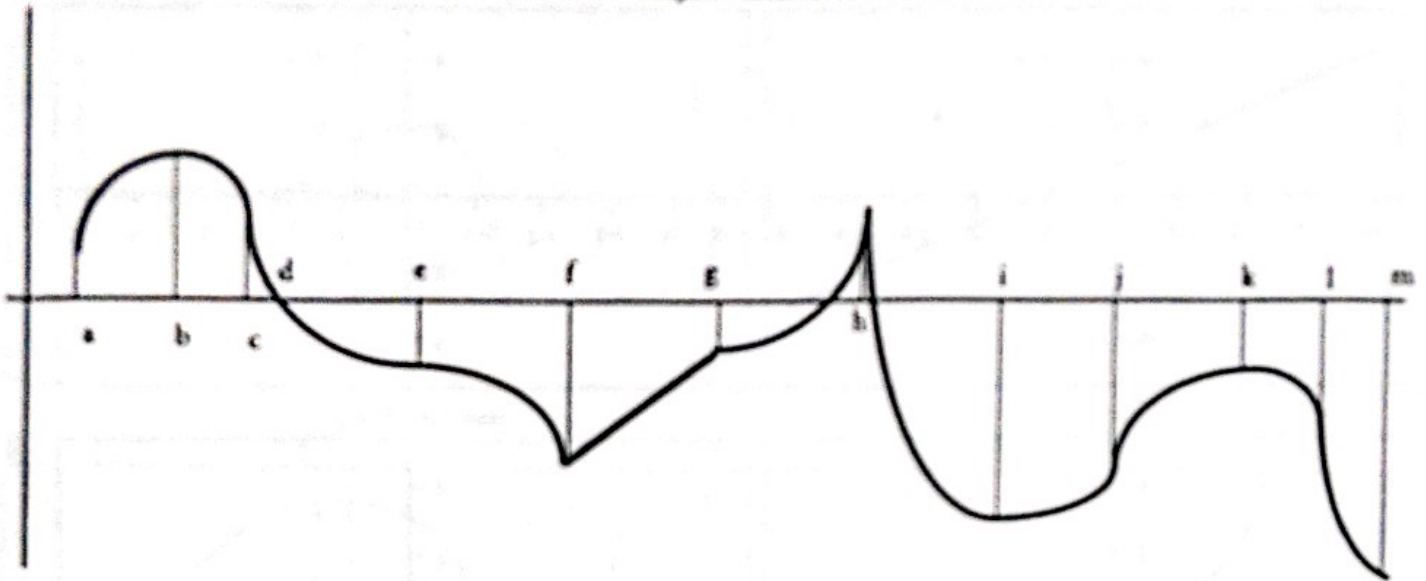


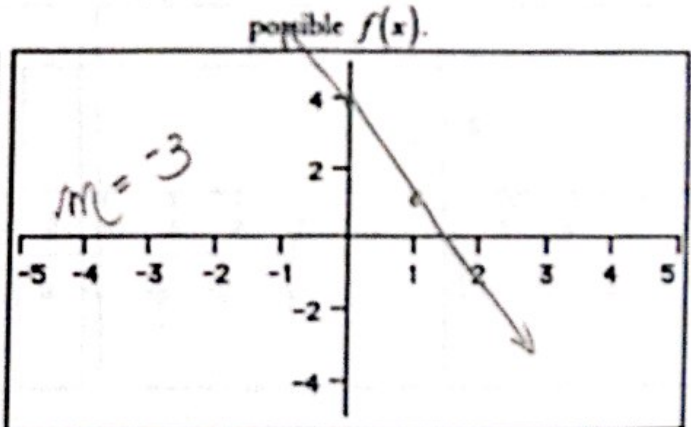
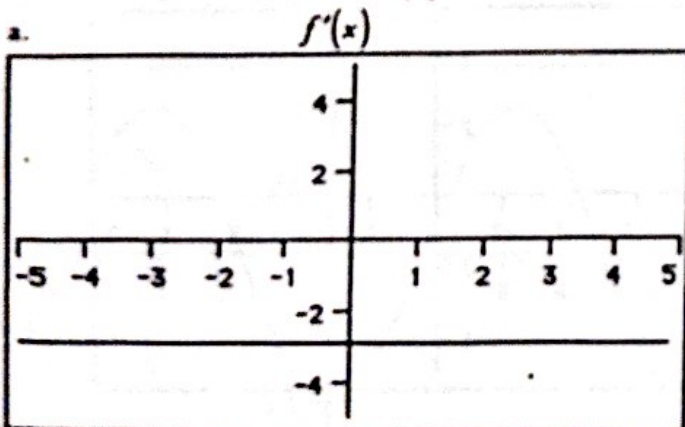
Function Analysis - Homework



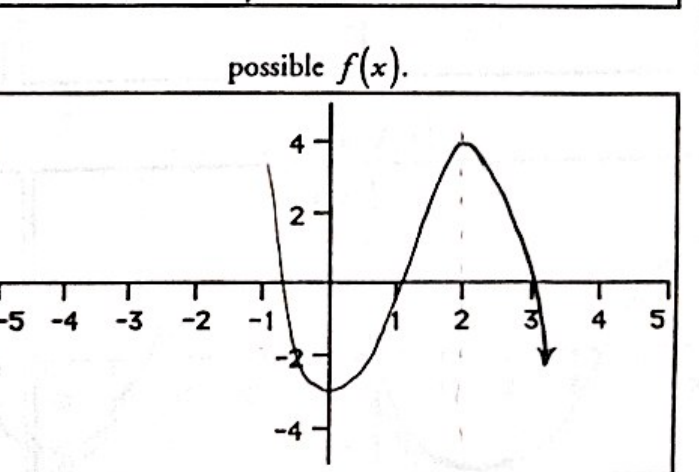
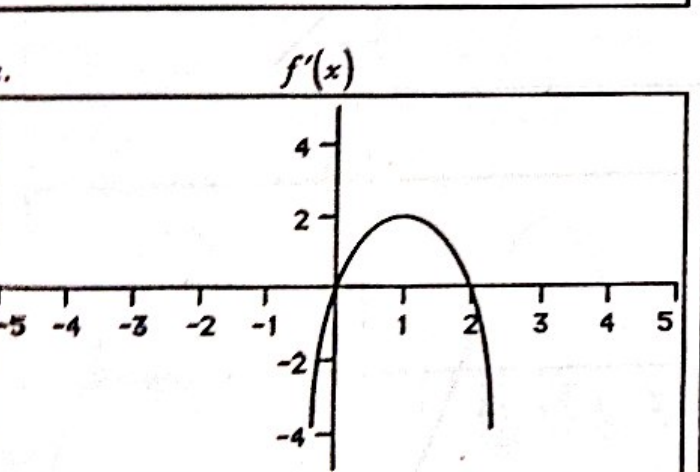
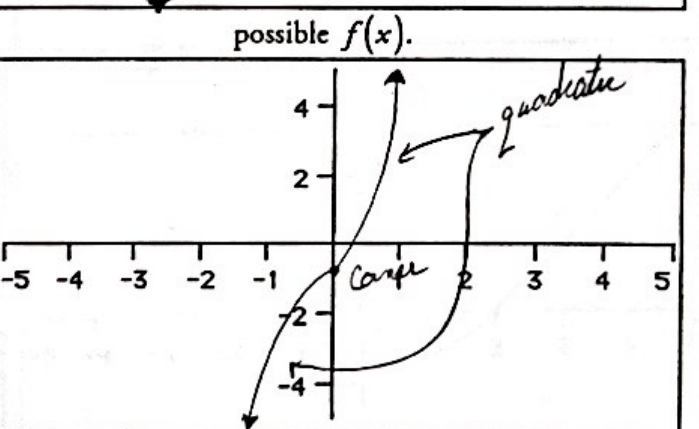
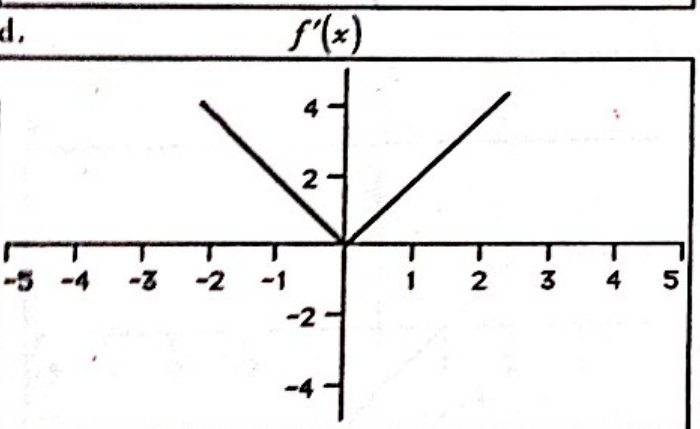
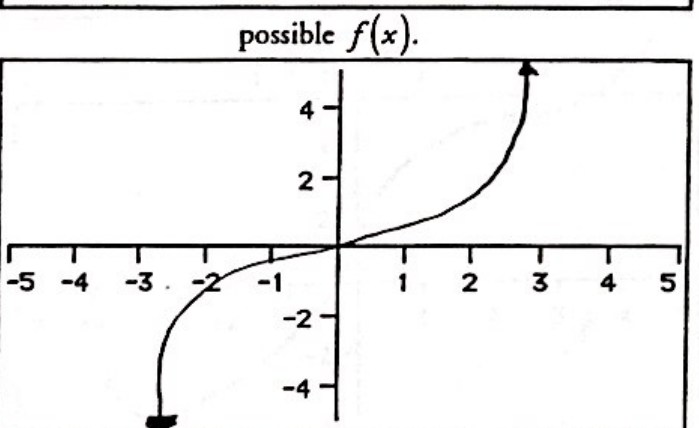
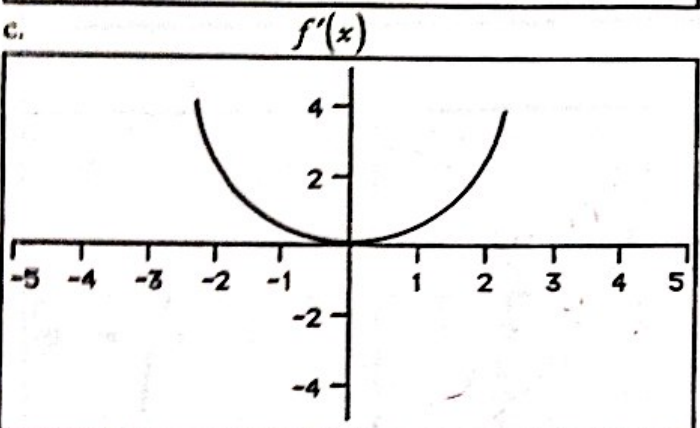
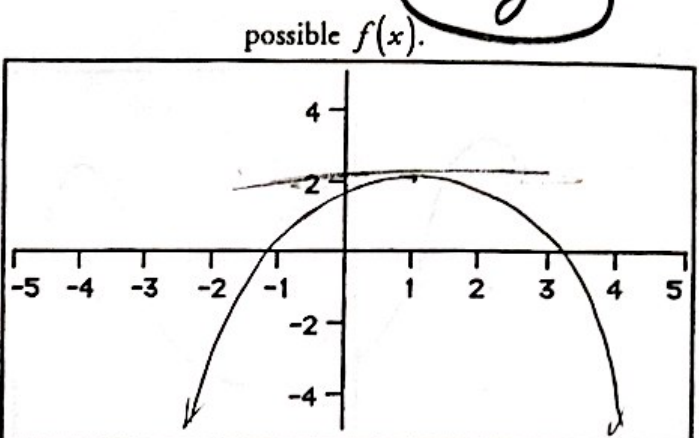
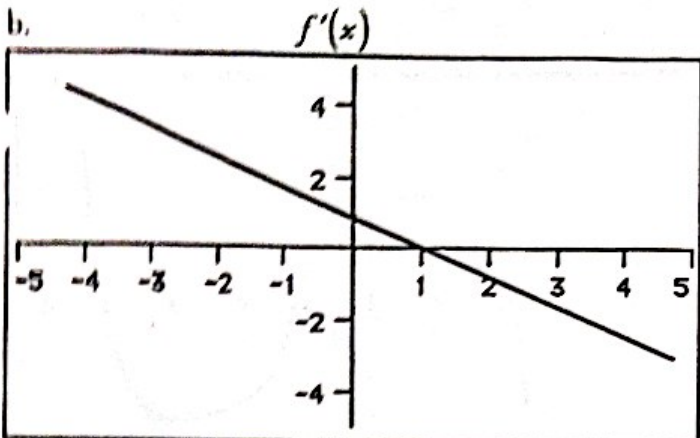
1. For each term, determine if it is applicable at the x -values $a - m$.

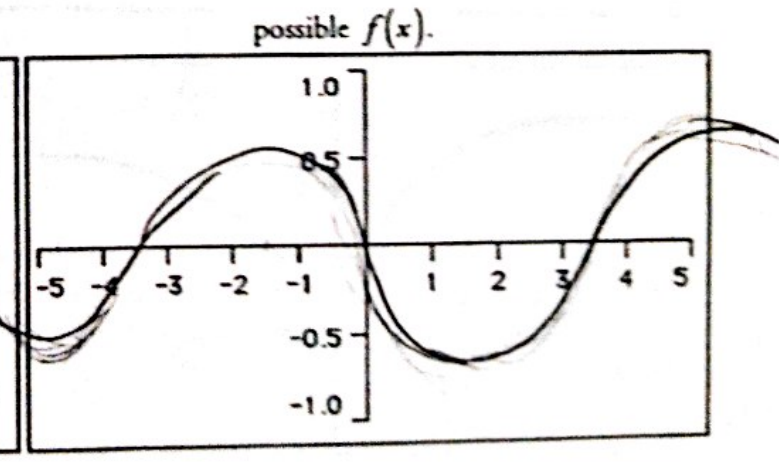
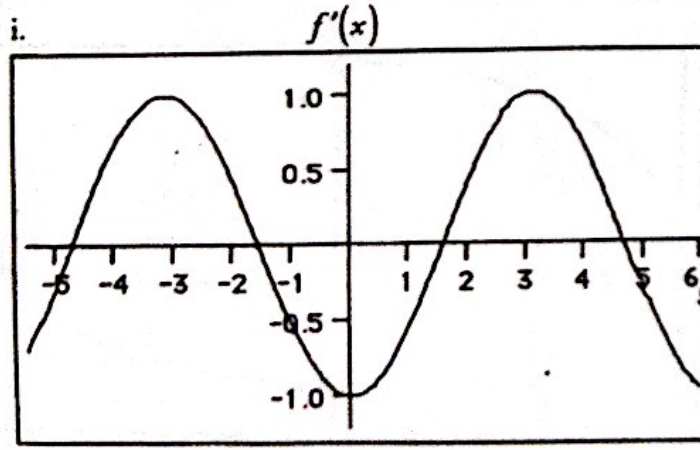
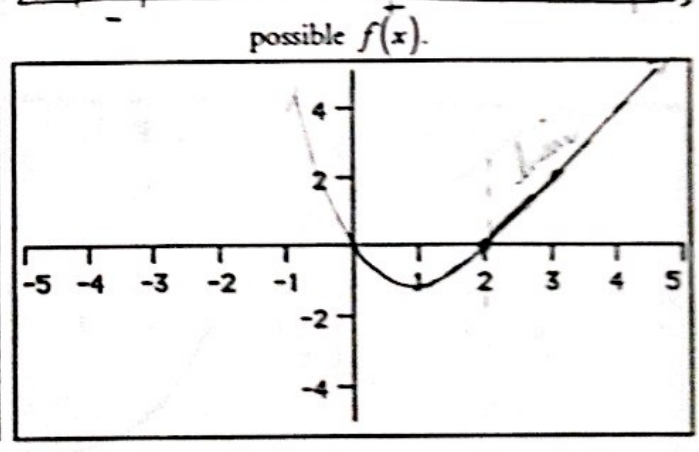
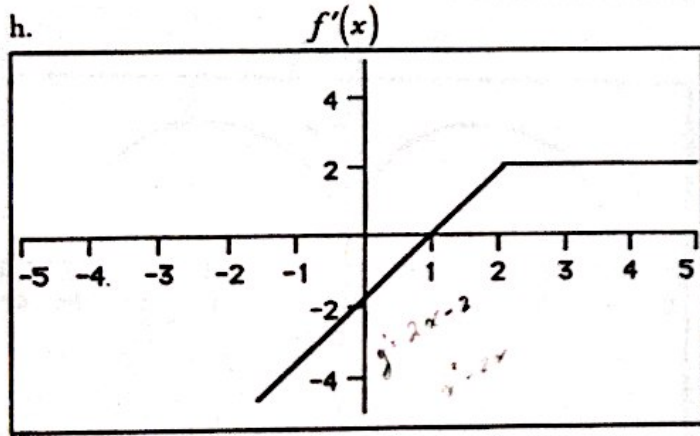
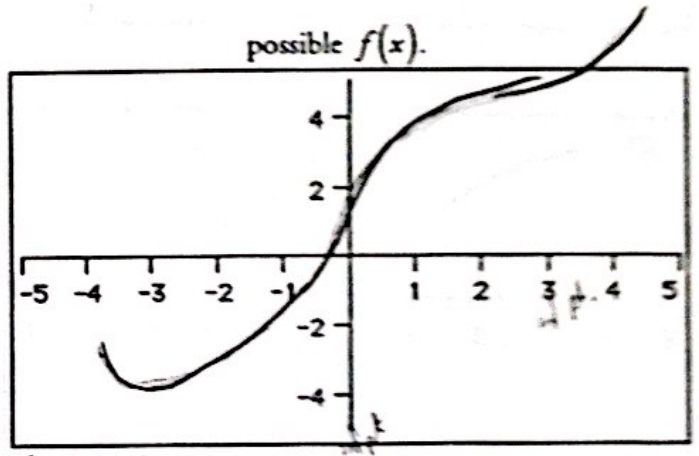
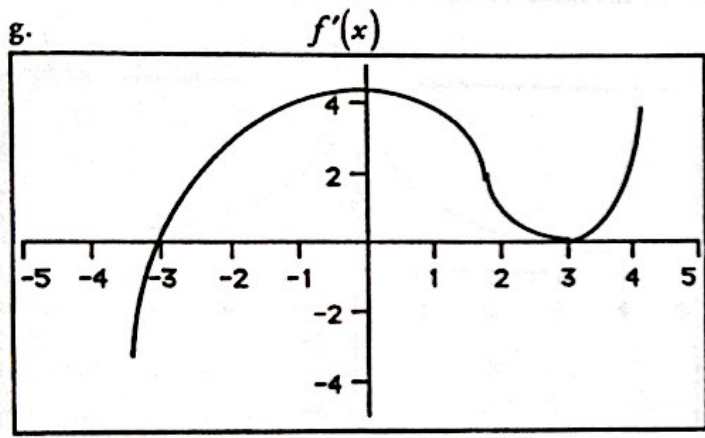
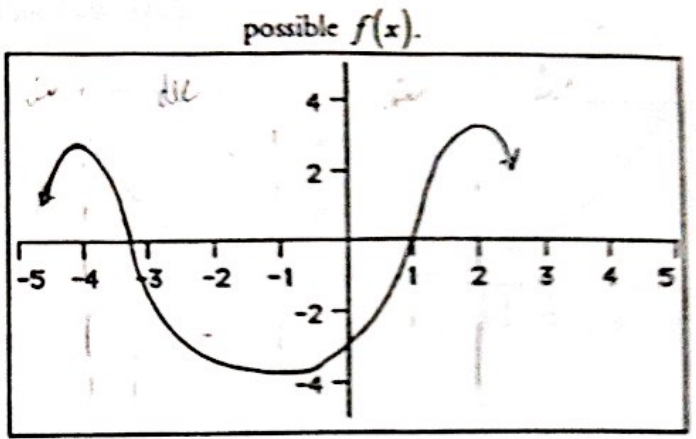
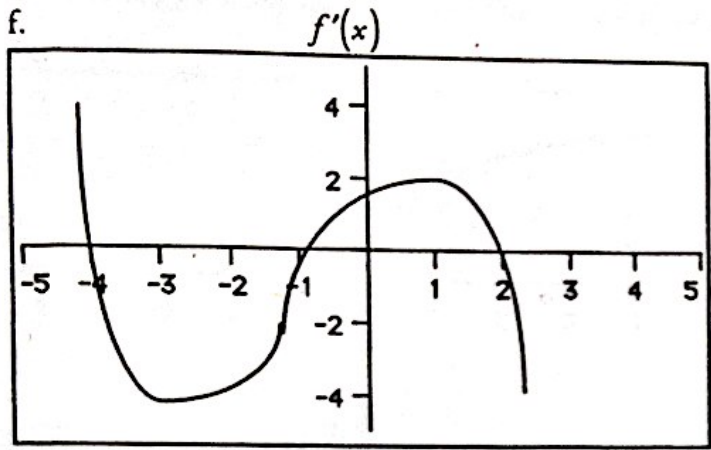
	Critical Point	Relative Minimum	Relative Maximum	Stationary Point	Inflection Point	Absolute Minimum	Absolute Maximum
a							
b	✓		✓	✓			✓
c					✓		
d							
e	✓			✓	✓		
f	✓		✓				
g	✓						
h	✓		✓				
i	✓		✓	✓			
j	✓				✓		
k	✓		✓	✓			
l	✓				✓		
m		✓				✓	

2) You are given a graph of $f'(x)$. Draw a picture of a possible $f(x)$.



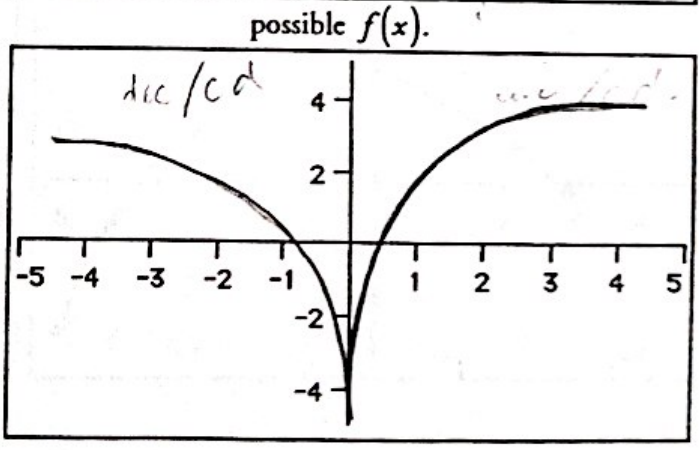
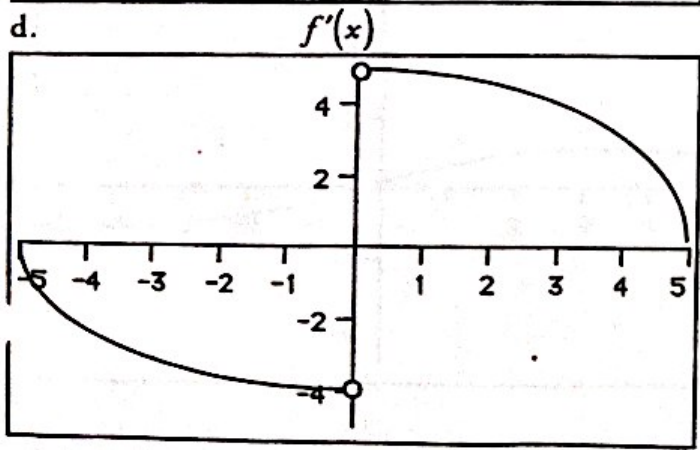
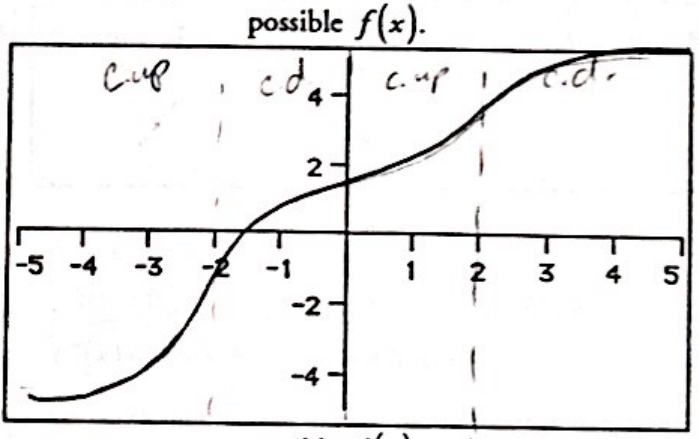
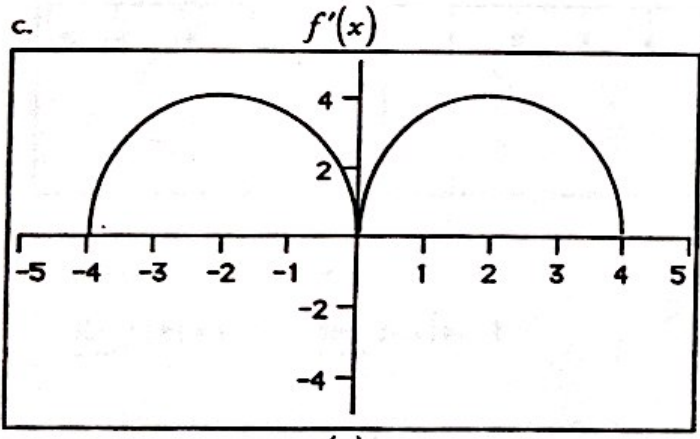
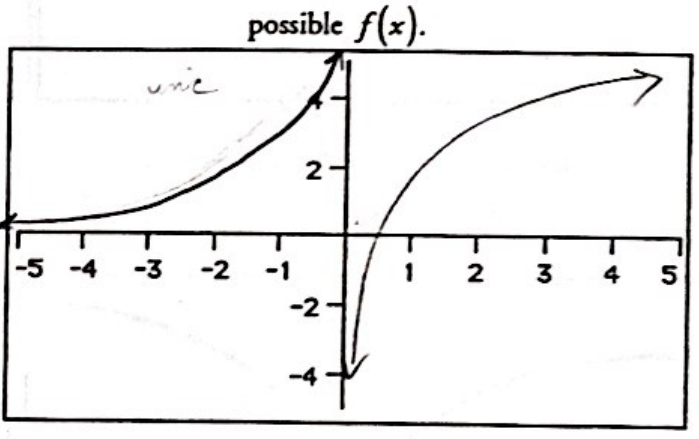
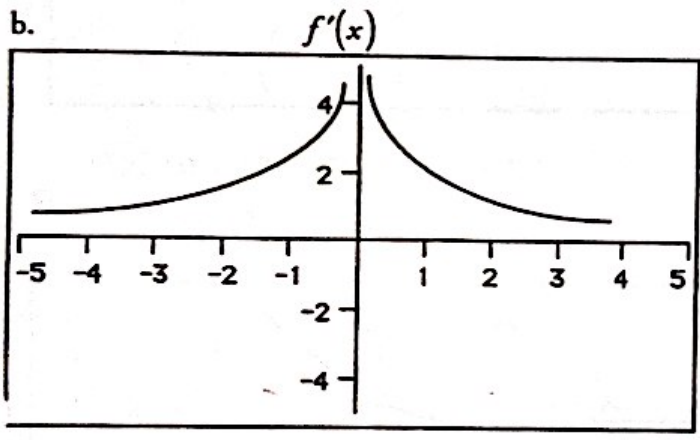
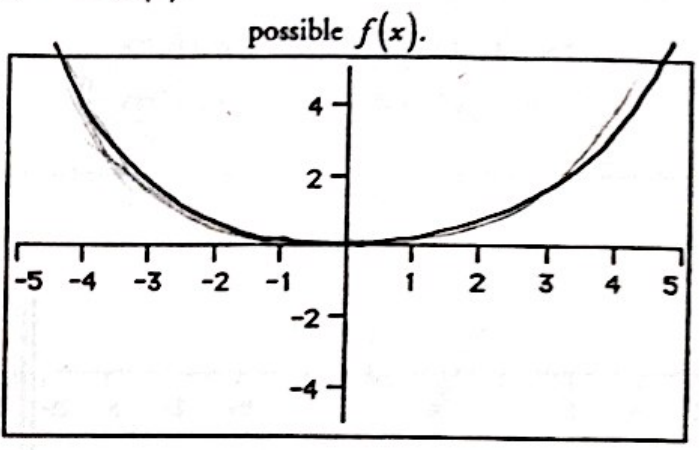
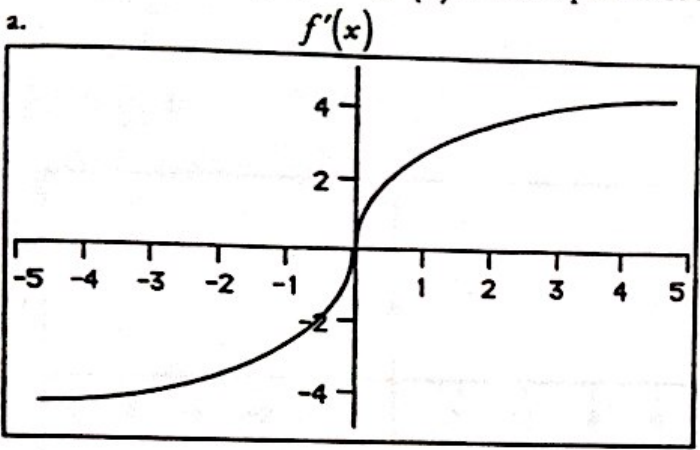
Key





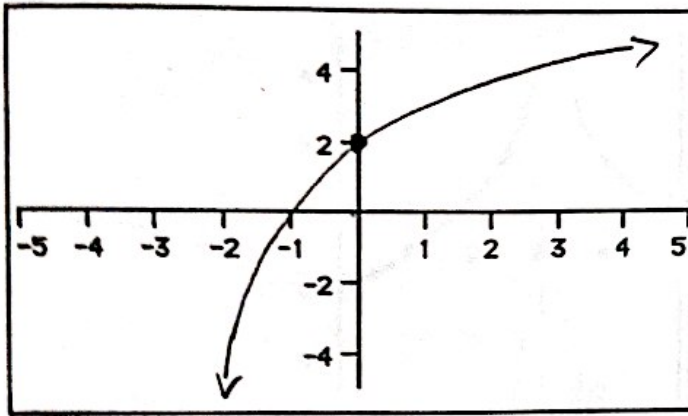
dec / inc
 dec 0 inc

3) You are given a graph of $f'(x)$. Draw a picture of a possible $f(x)$.

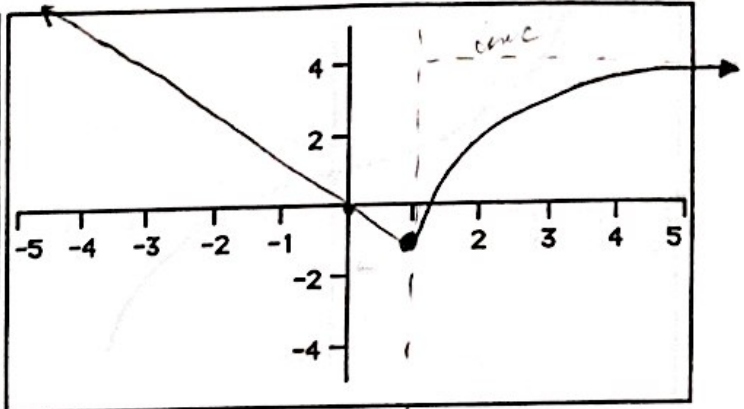


4) Sketch a possible $f(x)$ given the following information.

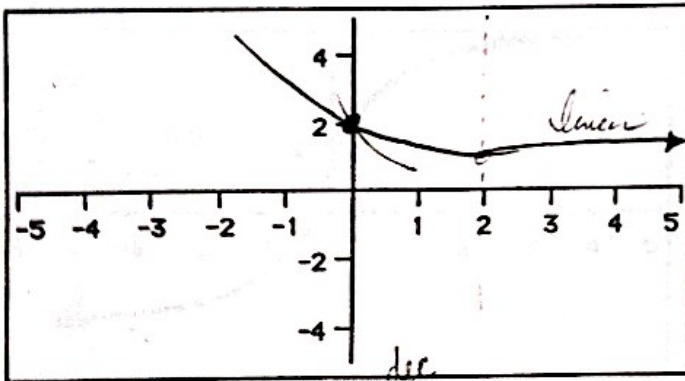
a. $f'(x) > 0, x < 0$ $f''(x) < 0$
 $f(0) = 2$



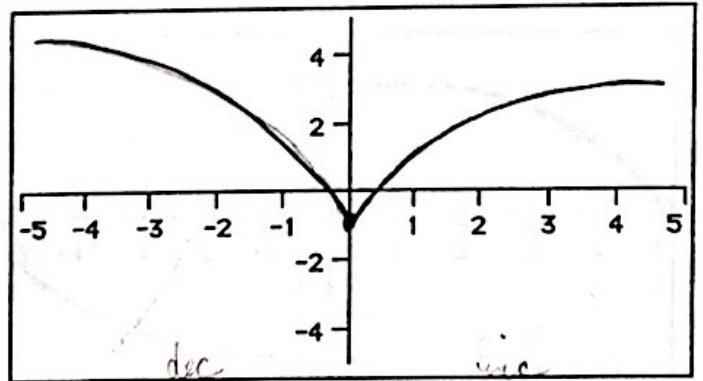
b. $f'(x) > 0, x > 1$ $f'(x) = -1, x < 1$
 $f(1) = -1$ $\lim_{x \rightarrow -\infty} f(x) = 4$



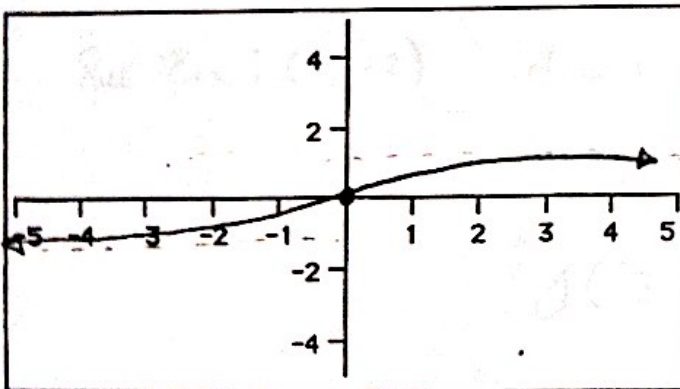
c. $f'(x) < 0, x < 2$ $f''(x) > 0, x < 2$
 $f(x) = 1, x \geq 2$ y -intercept = 2



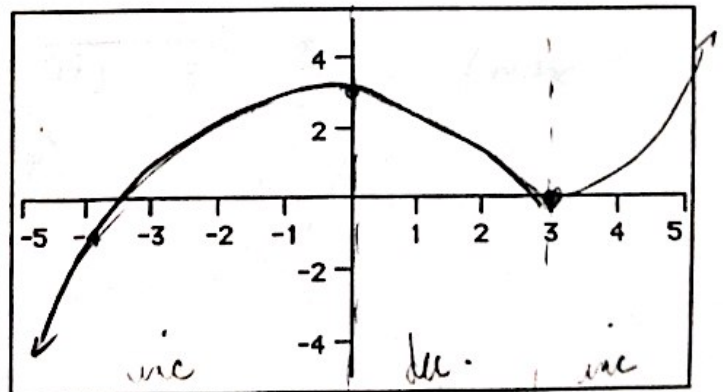
d. $f'(x) < 0, x < 0$ $f'(x) > 0, x > 0$
 $f''(x) < 0$ $f(0) = -1$



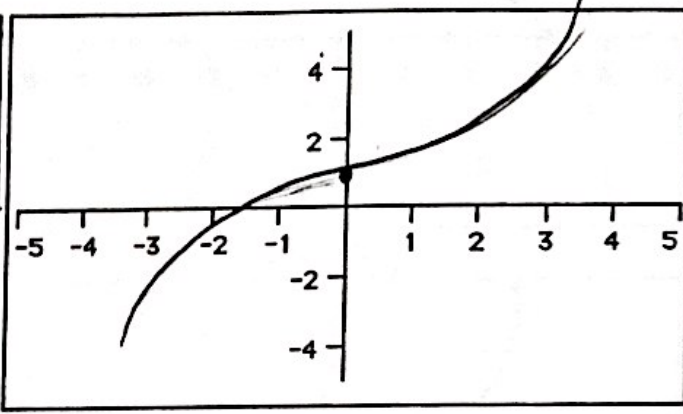
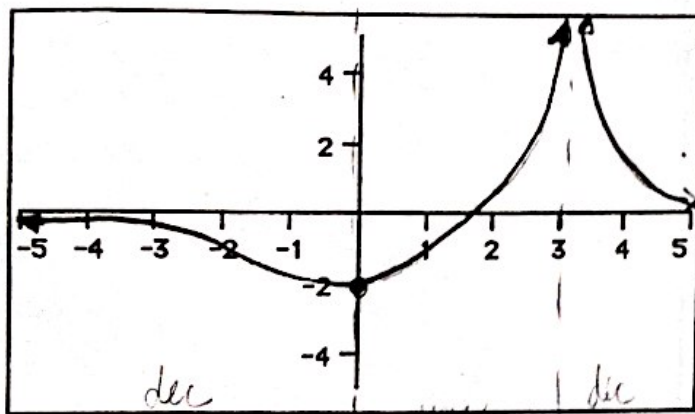
e. $f'(x) > 0$ $f(0) = 0$
 $\lim_{x \rightarrow -\infty} f(x) = 1$ $\lim_{x \rightarrow -\infty} f(x) = -1$



f. $f'(x) > 0, x < 0$ $f'(x) > 0, x > 3$ $f'(x) < 0, 0 < x < 3$
 $f(0) = 0$ $f(0) = 3$ $f(3) = 0$
 $f''(x) < 0, x < 3$ $f''(x) > 0, x > 3$

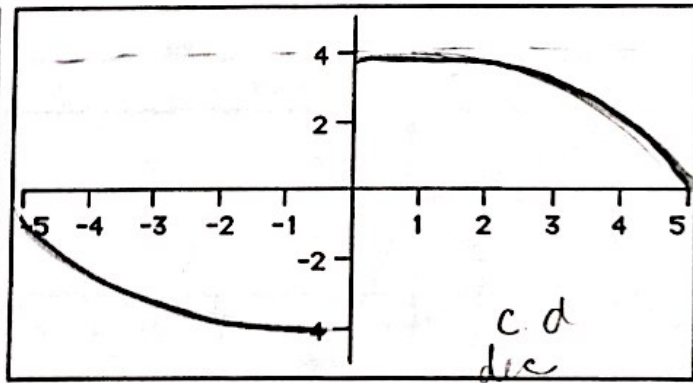
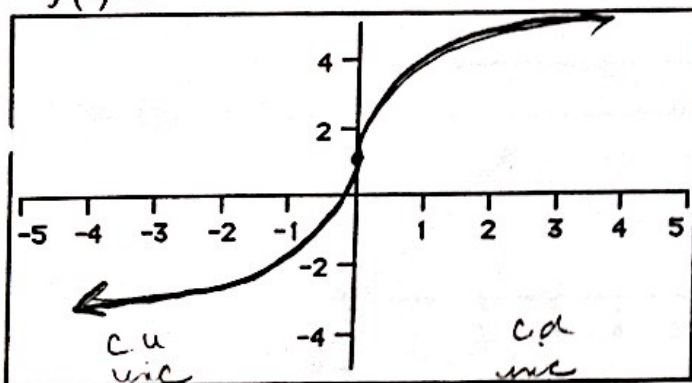


$f'(x) < 0, x < 0$ $f'(x) < 0, x > 3$ $f'(x) > 0, 0 < x < 3$ $f'(x) > 0, x \neq 0$ $f'(0) = 0$
 g. $f'(0) = 0$ $f(0) = -2$ $f''(-2) = 0$ h. $f''(0) < 0, x < 0$ $f''(0) > 0, x > 0$
 $\lim_{x \rightarrow -\infty} f(x) = 0$ $\lim_{x \rightarrow 3} f(x) = \infty$ $f(0) = 1$ $f''(0) = 0$



i. $f'(x) > 0, x \neq 0$ $f'(0)$ DNE
 $f''(x) > 0, x < 0$ $f''(x) < 0, x > 0$
 $f(0) = 1$

j. $f'(x) < 0, x > 0$ $f''(x) < 0, x > 0$
 $\lim_{x \rightarrow 0^+} f(x) = 4$ f is symmetric to the origin



5) Find all points of relative maximum and relative and points of inflection if any. Justify your answers. Confirm by calculator.

a. $f(x) = x^2 - 8x + 4$

b. $f(x) = 1 + 12x - 3x^2 - 2x^3$

c. $f(x) = (2x - 5)^3$

Rel Min: $(4, -12)$

Min $(-2, -19)$

No min/max

Max $(1, 8)$

Inf $(\frac{5}{2}, 0)$

Inf $(-\frac{1}{2}, -5\frac{1}{2})$

d. $f(x) = 3\sqrt{x} - 2$
 $f'(x) = \frac{3}{2}x^{-1/2}$
 $f''(x) = -\frac{3}{4}x^{-3/2}$
 No max/min
 Inf: $(0, -2)$

e. $f(x) = \frac{x^2}{x^2 - 4}$
 $f'(x) = \frac{-8x}{(x^2 - 4)^2}$
 max: $(0, 0)$
 Inf: $(-2,)$
 $(2,)$
 Vert Asy at ± 2

f. $f(x) = \sin^2 x + \sin x$
 $f'(x) = 2\sin x \cos x + \cos x$
 $f''(x) = 2\cos^2 x - \sin^2 x$
 Max: $(\frac{\pi}{2},)$
 $(\frac{3\pi}{2},)$
 Min: $(\frac{7\pi}{6},)$
 $(\frac{11\pi}{6},)$

g. $f(x) = x - \cos x$
 No max/min
 Inf: $(\frac{\pi}{2},)$
 $(\frac{3\pi}{2},)$

h. $f(x) = x\sqrt{x+4}$
 $x \geq -4$
 max: $(-4, 0)$
 min: $(\frac{-8}{3}, \frac{-16}{3\sqrt{3}})$
 Inf: none
 Domain: $x \geq -4$

i. $f(x) = (x^2 - 16)^{2/3}$
 Max: $(0, 4\sqrt[3]{4})$
 Min: $(\pm 4, 0)$
 Inf: $(-4, 4)$
 $(\pm 4\sqrt{3}, ?)$