Concavity and the Second Derivative Test

1. Determine the open intervals on which the graph is concave upward or concave downward
(similar to p.235 #5-18)

$$f(x)=\frac{5}{6}x^3-x^2+3x-1$$

2. Determine the open intervals on which the graph is concave upward or concave downward
(similar to p.235 #5-18)

$$f(x)=\frac{x^2-4}{3x-1}$$

3. Determine the open intervals on which the graph is concave upward or concave downward
(similar to p.235 #5-18)

$$f(x)=x+\frac{1}{\cos x}$$

4. Find the points of inflection and discuss the concavity of the graph of the function
(similar to p.235 #19-42)

$$f(x)=x^3+9x^2+6x-12$$

6. Find the points of inflection and discuss the concavity of the graph of the function
(similar to p.235 #19-42)

$$f(x)=x\sqrt{4+x}$$

7. Find the points of inflection and discuss the concavity of the graph of the function (similar to p.235 #19-42)

$$f(x) = 2\sin x - 2\cos x$$

8. Find the points of inflection and discuss the concavity of the graph of the function (similar to p.235 #19-42)

$$f(x) = e^{x^2 - 3x}$$

9. Find the points of inflection and discuss the concavity of the graph of the function (similar to p.235 #19-42)

$$f(x) = \arccos(x^2)$$

Second Derivative Test

Let f be a function such that f'(c) = 0 and the second derivative of f exists on an open interval containing c

1. If f''(c) > 0, then f(c) is a relative minimum
2. If f''(c) < 0, then f(c) is a relative maximum
3. If f''(c) = 0, the test fails

10. Find all relative extrema. Use the Second Derivative Test where applicable (similar to p.235 #43-70)

$$f(x) = \frac{1}{3}x^3 - \frac{7}{2}x^2 + 10x + 2$$