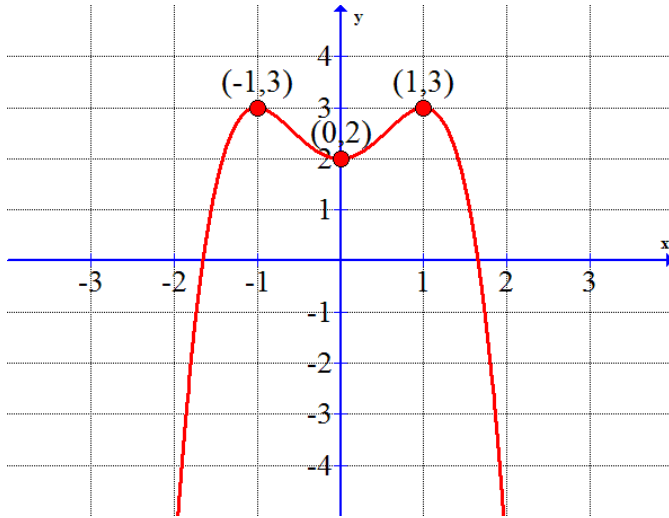Chapter 3 Practice Test Part 1 (Complete all problems)

1) Consider the graph of the function f(x) below.

a) interval(s) where the graph is increasing.
b) interval(s) where the graph is decreasing.
c) the coordinates of relative maximum point if any
d) the relative maximum value
e) the coordinates of the relative minimum point if any
f) the relative minimum value

2) $f(x) = 6xe^x$
Find the following:
a) f′(x)
b) the critical numbers
c) interval(s) where the graph is increasing.
d) interval(s) where the graph is decreasing.
e) the coordinates of relative maximum point if any
f) the relative maximum value
g) the coordinates of the relative minimum point if any
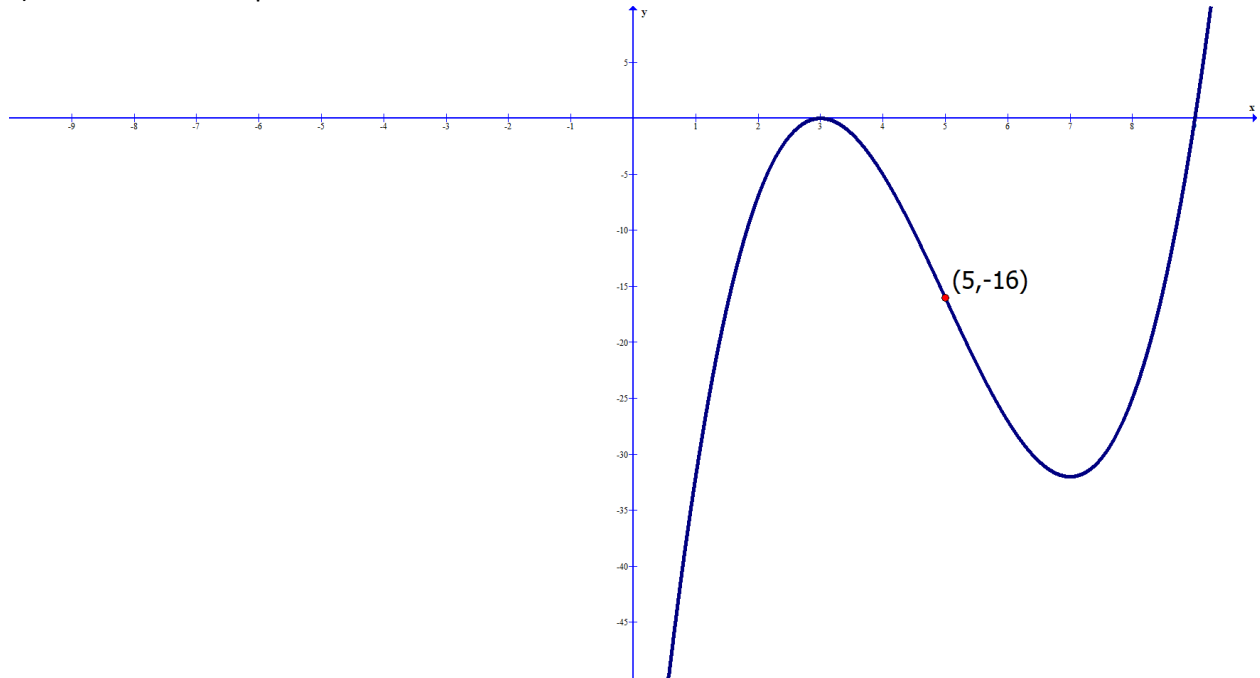h) the relative minimum value

3) Consider the graph of the function f(x) below.

a) Find the open interval(s) where the graph of the function is concave up
b) Find the open interval(s) where the graph of the function is concave down.
c) Find all inflection points

(5,-16)

4) $f(x) = x^3 - 30x^2$
a) Find the open interval(s) where the graph of the function is concave up
b) Find the open interval(s) where the graph of the function is concave down.
c) Find all inflection points

Chapter 3 Practice Test Part 2

5) $f(x) = x^3 - 3x$

 Find the following.

a) Find the x-intercept(s), if any
b) Find the y-intercept, in there is one
c) Find the interval(s) where the graph of the function is increasing
d) Find the interval(s) where the graph of the function is decreasing
e) Find all relative maxima
f) Find all relative minima
g) Find the interval(s) where the graph of the function is concave up (if any)
h) Find the interval(s) where the graph of the function is concave down (if any)
i) Find all inflection points (if any)
j) Sketch a graph

6): Find the following. $f(x) = \frac{x-2}{x+3}$ hint: $f'(x) = \frac{5}{(x+3)^2}$ $f''(x) = \frac{-10}{(x+3)^2}$

a) Find the domain
b) Find the equation of the vertical asymptote
c) Find the x-intercept(s), if any
d) Find the y-intercept, in there is one
e) Find all horizontal asymptotes
f) Find the interval(s) where the graph of the function is increasing
g) Find the interval(s) where the graph of the function is decreasing
h) Find all relative maxima and
i) Find all relative minima
j) Find the interval(s) where the graph of the function is concave up (if any)
k) Find the interval(s) where the graph of the function is concave down (if any)
l) Find all inflection points (if any)
m) Sketch a graph

7) A company makes a single product. The cost function for the product is given by:
$C(x) = 0.5x^2 + 30x + 100$ where $C(x)$ is the total cost to produce x units of the product.
The demand function is given by $p(x) = -2x + 90$, where $p(x)$ is the price to sell x units of the product.

a) Create a revenue function.
b) Create a profit function.
c) How many units must the company produce and sell to maximize profit?
d) What is the maximum profit?
e) What price per unit must be charged to make maximum profit?