Calculus 12 **LG 10/11 Quiz Version A** **/17**

Name:_____ Date:_____

1. $f(x) = 5x^4 - x^5$ (4 marks)

a) Find the intervals where *f* is increasing and where *f* is decreasing.
b) Find the intervals where *f* is concave up and where *f* is concave down.
c) List any inflection points.

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

a) Find the intervals where *f* is increasing and where *f* is decreasing.
b) Find the intervals where *f* is concave up and where *f* is concave down.
c) List any inflection points.

3. Are the following true or false? (1/2 mark each)

a) If $f"(x) > 0$ on the open interval (*a*, *b*) then $f'(x)$ is increasing on (*a*, *b*).

b) If $f(x) > 0$, then $f'(x) > 0$.

c) If $f"(x) = 0$, then *x* is a point of inflection.

d) If $f'(x) < 0$, then $f(x)$ is decreasing.

4. Sketch a continuous curve having the following properties: (3 marks)

$f(-3) = 27,\ f(0) = \frac{27}{2},\quad f(3) = 0,\quad f'(x) > 0$ for $|x| > 3$

$f'(-3) = f'(3) = 0,\quad f''(x) < 0$ for $x < 0,\ f''(x) > 0$ for $x > 0$

5. Find all relative extrema for $f(x) = x + \cos(2x)\,,\ 0 < x < \pi$ (4 marks)