

II. For each of the following functions find:

1) $f(x) = x^3 - 6x^2 + 9x + 1$

a) Domain $(-\infty, \infty)$

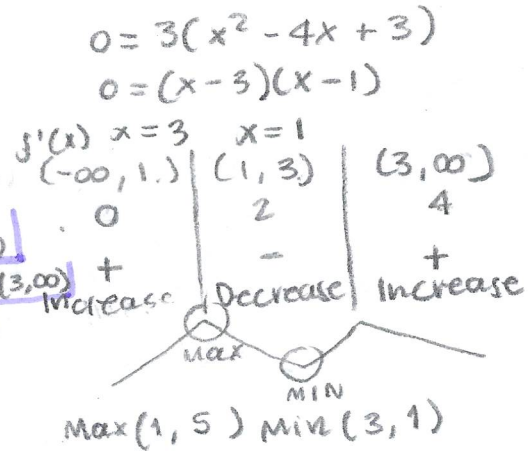
b) Derivative of $f(x) = 3x^2 - 12x + 9$

c) Critical Values $x = 3, x = 1$

d) Maximum and minimum coordinates $(1, 5)$ $(3, 1)$

e) Intervals where the function is increasing $(-\infty, 1) \cup (3, \infty)$

f) Intervals where the function is decreasing $(1, 3)$



2) $y = \frac{1}{3}x^3 + \frac{1}{2}x^2 - 6x + 8$

a) Domain $(-\infty, \infty)$

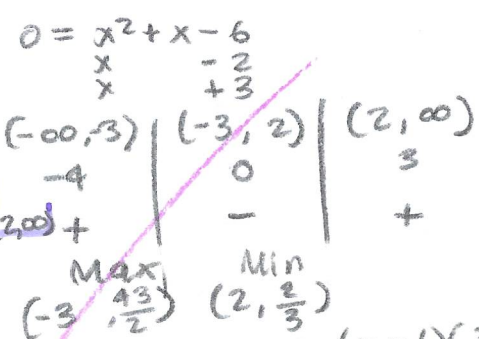
b) Derivative of $f(x) = x^2 + x - 6$

c) Critical Values $x = 2, x = -3$

d) Maximum and minimum coordinates $(-3, 21)$ $(2, \frac{2}{3})$

e) Intervals where the function is increasing $(-\infty, -3) \cup (2, \infty)$

f) Intervals where the function is decreasing $(-3, 2)$



3) $f(x) = x^3 + x^2 - 5x - 5$

a) Domain $(-\infty, \infty)$

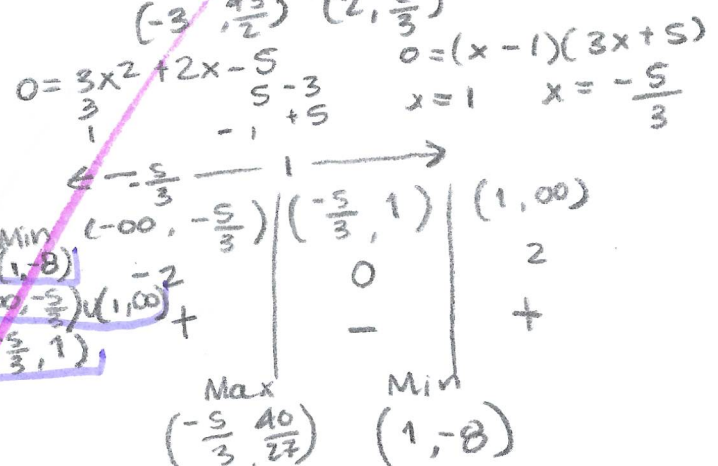
b) Derivative of $f(x) = 3x^2 + 2x - 5$

c) Critical Values $x = 1, x = -\frac{5}{3}$

d) Maximum and minimum coordinates $(-\frac{5}{3}, \frac{43}{27})$ $(1, -8)$

e) Intervals where the function is increasing $(-\infty, -\frac{5}{3}) \cup (1, \infty)$

f) Intervals where the function is decreasing $(-\frac{5}{3}, 1)$



4) $f(x) = x^4 - 8x^2 + 1$

a) Domain $(-\infty, \infty)$

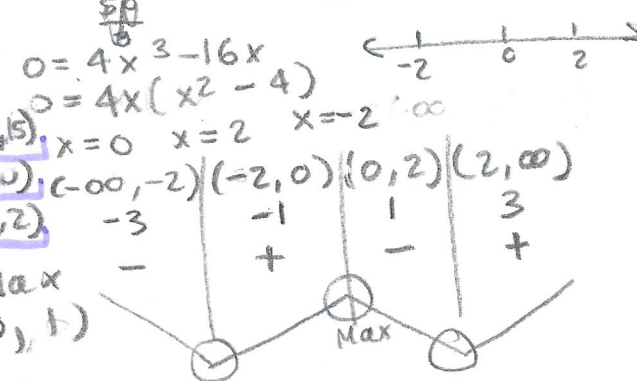
b) Derivative of $f(x) = 4x^3 - 16x$

c) Critical Values $x = 0, x = 2, x = -2$

d) Maximum and minimum coordinates $(0, 1)$ $(-2, -15)$ $(2, 5)$

e) Intervals where the function is increasing $(-2, 0) \cup (2, \infty)$

f) Intervals where the function is decreasing $(-\infty, -2) \cup (0, 2)$



5) $g(x) = \frac{x^4}{4} - \frac{x^3}{3} - 3x^2 + 1$

a) Domain $(-\infty, \infty)$

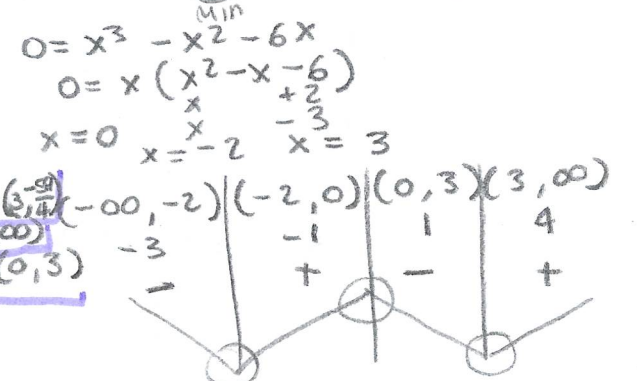
b) Derivative of $f(x) = x^3 - x^2 - 6x$

c) Critical Values $x = 0, x = -2, x = 3$

d) Maximum and minimum coordinates $(0, 1)$ $(-2, \frac{35}{3})$ $(3, -9)$

e) Intervals where the function is increasing $(-2, 0) \cup (3, \infty)$

f) Intervals where the function is decreasing $(-\infty, -2) \cup (0, 3)$



Min $(3, -\frac{9}{4})$ Min $(-2, \frac{35}{3})$ Max $(0, 1)$