

Calculus Worksheet #4 Unit 1 Selected Solutions

Find all stationary points for each of the following functions. Use values of $f(x)$, the function itself, to classify each as a maximum, a minimum, or neither. Show your work and your answers neatly organized.

2. $y = f(x) = x^4 + 3x^3 - 14x^2 + 10$

$$f'(x) = 4x^3 + 9x^2 - 28x$$

$$4x^3 + 9x^2 - 28x = 0$$

$$x(4x^2 + 9x - 29) = 0$$

$$x(4x - 7)(x + 4) = 0$$

$$x = 0 \text{ or } x = 7/4 \text{ or } x = -4$$

$f(-4) = -150$ is a relative minimum.

$f(0) = 10$ is a relative maximum.

$f(1.75) \approx -7.42$ is a relative minimum.

x	f(x)	
-5	-90	} ← <u>minimum</u>
-4	-150	
-1	-6	
0	10	} ← <u>maximum</u>
1	0	
7/4	-7.42	} ← <u>minimum</u>
2	-6	

Find all stationary points for each of the following functions. Use values of $f'(x)$, the slope, to classify each as a maximum, a minimum, or neither. Show your work and your answers neatly organized.

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

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

$$3x^2 - 2x - 5 = 0$$

$$(3x - 5)(x + 1) = 0$$

$$x = 5/3 \text{ or } x = -1$$

$f(-1) = 1$ is a relative maximum.

$f(5/3) \approx -8.48$ is a relative minimum

x	f(x)	f'(x)	
-2		+11	} ← <u>maximum</u>
-1	1	0	
0		-5	
5/3	-8.48	0	} ← <u>minimum</u>
2		+3	