**Name:** _____ **TC**

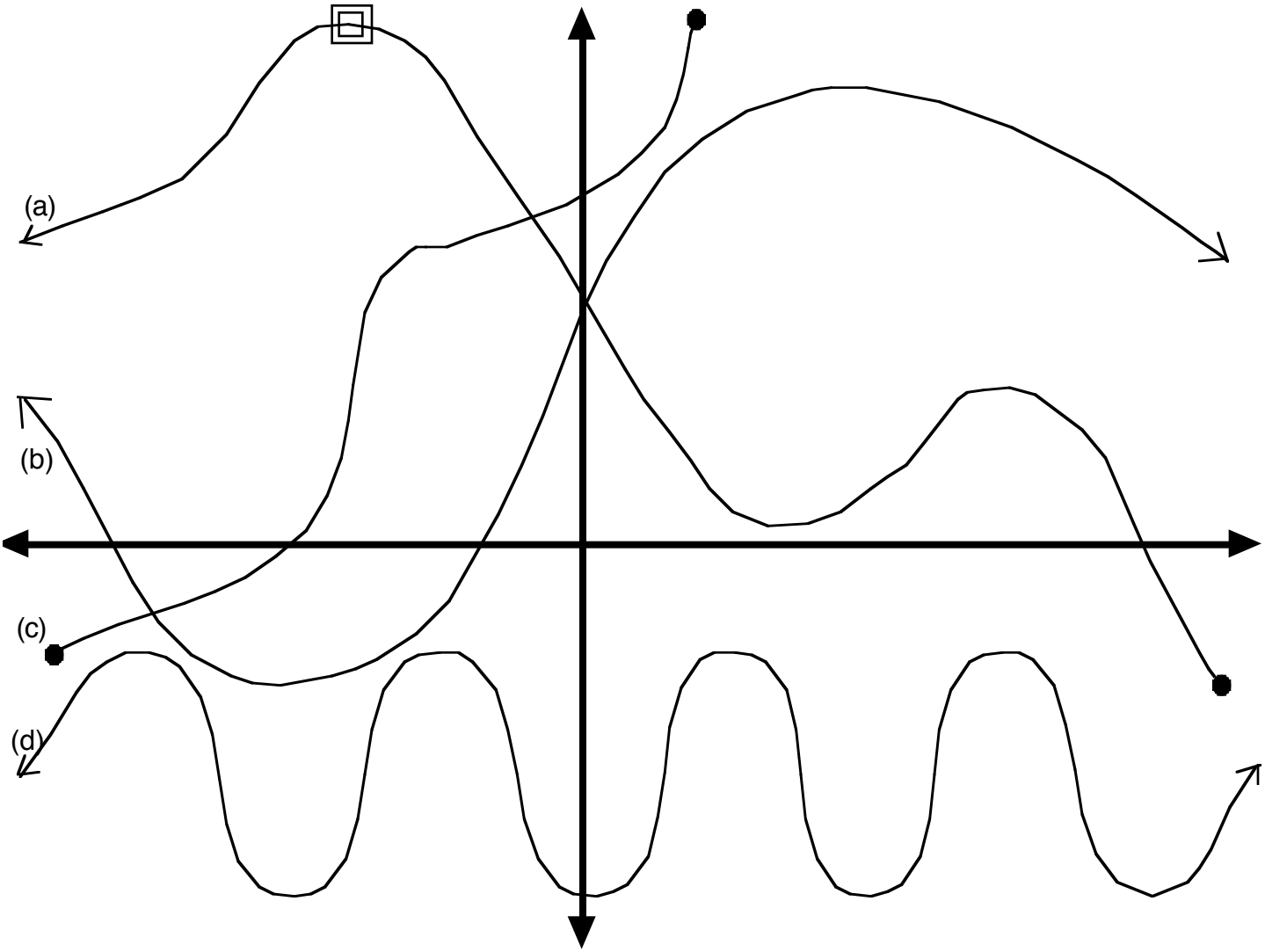
## CLASSWORK 41

1. Label each function in the graph below with the following symbols wherever it is appropriate.

□ = Relative maximum ▣ = Absolute maximum

○ = Relative minimum ◎ = Absolute minimum

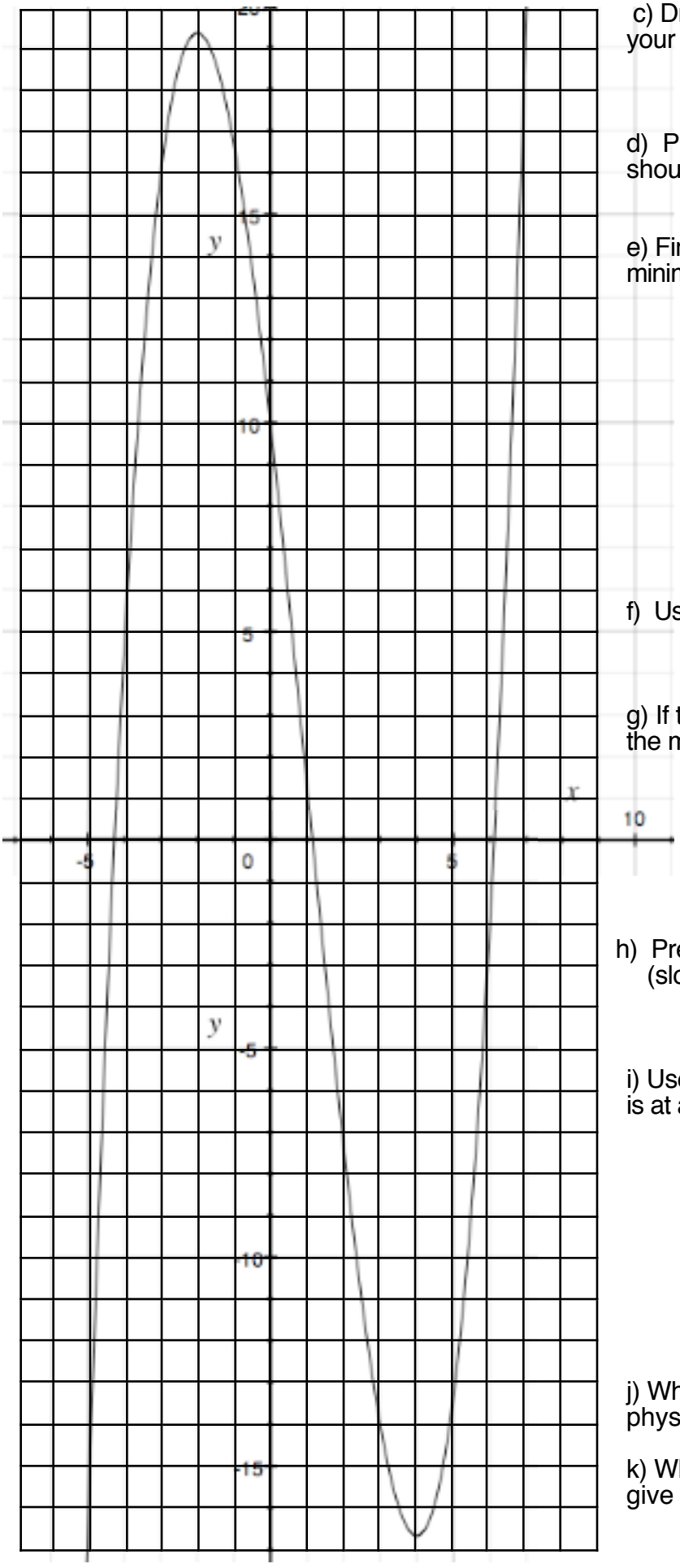
Then label with **" Z "** everywhere the derivative is zero.




2. You are given the function $y = 1/3x^3 - x^2 - 8x + 10$ (graph on next page).

a) What is the slope of the graph at $x = 1$ ?

b) What is the slope of the graph at $x = -3$ ?




c) Draw tangent lines on the graph to show that your answers to (a) and (b) make sense.

d) Predict from the graph where the slope should be zero.

e) Find the exact location of the maximum and minimum values using calculus.

f) Use the calculator to check your answers.

g) If this is a position versus time graph, what do the maximum and minumum represent?

h) Predict from the graph where the **speed** (slope) is at a maximum.

i) Use calculus to find the exact time when speed is at a maximum.

j) What is the derivative of speed called in physics?

k) Why would setting this quantity equal to zero give you the time of maximum speed?

3. a) Find the extrema (minimums and maximums) of the function $y = 1/2x^4 - 4x^3 - 16x^2 + 12$ and say which is which.

b) Use the calculator to check your answer.

4. a) Find the extrema (minimums and maximums) of the function $y = 1/x - 1/x^2$ over the closed interval [1/4, 8].

b) Use the calculator to check your answer.

Practice Problems

1. Find the maxima and minima of $y = 4x^3 - 2x + 6$

2. Two numbers add to 40. What is the maximum product?

3. Two numbers add to C. What is the maximum product? Prove it.