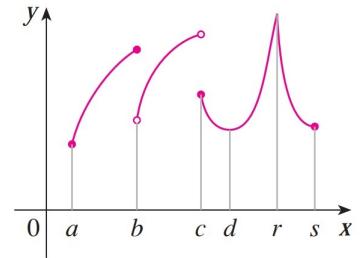


First Name: _____ Last Name: _____

Student-No: _____ Section: _____

Short answer questions

1. 3 marks In reference to the graph of function y provided, determine if the statements below are true or false on $[a, s]$. Each part is worth 0.5 mark.



- (a) The function has three points of discontinuity.
- (b) The function is not differentiable at three points.
- (c) The function has an absolute minimum and an absolute maximum, therefore Extreme Value theorem can be applied to it.
- (d) The function has two local minima.
- (e) $x = c$ is a local maximum.
- (f) The function has four critical points.

Long answer questions — you must show your work

2. 3 marks Show that for any $-2 \leq t \leq 2$, the inequality $-2 \leq t\sqrt{4-t^2} \leq 2$ holds.
Hint: How does this question translate in terms of absolute maximum and absolute minimum?

3. (a) 1 mark The cost function of a bicycle manufacturing company is given by $C = 10 + 0.1q^2 - 0.001q^3$ in thousand dollars where q is the number of bicycles manufactured. Using marginal cost, approximate the cost of manufacturing the 11th bicycle.

(b) 3 marks The relation between the demand (q) and price (p) of a product can be estimated by $p^2 + 2q^2 = 900$. Find the price elasticity of when $p = 10$ and recommend if the price has to be lowered or raised.