

Very short answer questions

1. 2 marks Each part is worth 1 marks. Please write your answers in the boxes.

Consider a function, $h(x)$, whose third Maclaurin polynomial is $-x + 2x^2 + \frac{2}{3}x^3$.

- (a) What is $h^{(3)}(0)$?

Answer:

- (b) What is $h(0)$?

Answer:

Short answer questions — you must show your work

2. 4 marks Each part is worth 2 marks.

- (a) Find the global maximum and the global minimum for $f(x) = 2x^3 + 9x^2 + 2$ on the interval $[-4, -1]$.

- (b) Consider a function $f(x)$ which has $f'''(x) = \frac{e^x}{4-x}$. Show that when we approximate $f(0)$ using its second Taylor polynomial around $x = -1$, the absolute error is less than $\frac{1}{20} = 0.05$.

Long answer question — you must show your work

3. 4 marks A 20m long extension ladder leaning against a wall starts collapsing at a rate of 2m/s, while the foot of the ladder remains a constant 5m from the wall. How fast is the ladder moving down the wall after 3.5 seconds?