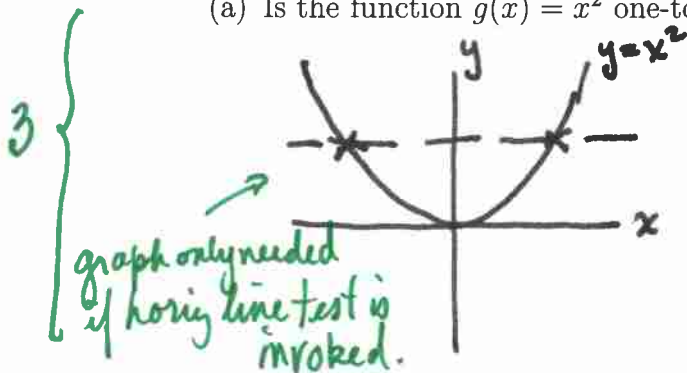


1. Inverse Functions:

yes pass test
no fails test

(a) Is the function $g(x) = x^2$ one-to-one? Explain your answer.



No, because the horizontal line test fails

Equivalently, $x=1$ and $x=-1$ have the same y value

either is fine.

(b) Find the inverse function for

$$f(x) = \sin(2x) \text{ where } -\frac{\pi}{4} \leq x \leq \frac{\pi}{4}$$

and give its domain and range expressed in interval notation.

Partial credit is ok always

4

$$\begin{aligned} & y = \sin(2x) \\ \Leftrightarrow & x = \sin^{-1}(2y) \\ \Leftrightarrow & \sin^{-1}x = 2y \\ \Leftrightarrow & y = f^{-1}(x) = \frac{1}{2}\sin^{-1}x. \end{aligned}$$

explanation should be given.

2 Domain $f^{-1} = \text{Range } f = [-1, 1]$ (Values of sine)

1 Range $f^{-1} = \text{Domain } f = [-\frac{\pi}{4}, \frac{\pi}{4}]$

2. Exponentials and Logs:

(a) Solve

$$\ln(x^3) - \ln x = 4$$

for x and express your answer without the use of decimals.

$$5 \left\{ \begin{array}{l} \Rightarrow 3 \ln x - \ln x = 4 \\ \Rightarrow 2 \ln x = 4 \\ \Rightarrow \ln x = \frac{4}{2} = 2 \\ \Rightarrow x = e^2 \end{array} \right.$$

not in decimal form

Give partial credit

(b) Solve the following equation for x :

$$5 \left\{ \begin{array}{l} \Rightarrow \sqrt{x+1} = \ln 1 = 0 \\ \Rightarrow x+1 = 0^2 = 0 \\ \Rightarrow x = -1 \end{array} \right.$$

important!