

Name (IN CAPITAL LETTERS!):

CID:

Question 2. *Multiple choice: Correct answers to parts 1-4 score +3 marks, an incorrect answer scores -1. Blank or ambiguous answers will score zero. There is no credit nor penalty for working. Total marks greater than 10 or less than zero will be rounded to 10 and 0.*

(1) If

$$f(x) = \frac{x+4}{x-1} \quad \text{for } x \neq 1,$$

then except when $x = 1$, the composed function $f(f(x))$ is equal to

- (a) x , (b) $\frac{x^2 + 8x + 16}{x^2 - 2x + 1}$, (c) $\frac{5x + 4}{(x - 1)^2}$, (d) none of these.

(2) The function $f(t) = \sin(|t|)$, defined for all t where $|t|$ denotes the absolute value, is

- (a) 2π -periodic, (b) π -periodic, (c) $\frac{1}{2}\pi$ -periodic, (d) not periodic.

(3) The function $h(x) = x^3 + ax$ is defined for all x where a is a given constant. When does the inverse function h^{-1} exist?

- (a) always, (b) never, (c) only if $a \geq 0$, (d) only if $a = 0$.

(4) What is the range of the function $\sin\left[\frac{1}{2}\pi \cos x\right]$ when x takes all real values?

- (a) $[-1, 1]$, (b) $(0, 1)$, (c) $[-\frac{1}{2}\pi, \frac{1}{2}\pi]$, (d) none of these.

(5) **No marks for this:** What total score between 0 and 10 is impossible for this question?

Answer. Correct answers:

1 (a)

2 (d)

3 (c)

4 (a)

Obey the instructions at the top. It is not possible to score 7 marks!