

Name:

MATH 105 - SEC 001, FALL 2010. QUIZ 9
TIME LIMIT: 15 MINUTES

INSTRUCTOR: GERARDO HERNÁNDEZ
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Good luck!

Problem 1. Give a practical interpretation in words of the following functions:

- (a) $k(g(t))$, where $L = k(H)$ is the length of a steel bar at temperature H and $H = g(t)$ is the temperature at time t

$k(g(t))$ is the length of the steel bar at time t .

- (b) $t(f(H))$, where $t(v)$ is the time of a trip at velocity v , and $v = f(H)$ is the velocity at temperature H .

The time of the trip at temperature H

Problem 2. Using your own words, briefly explain the process of **decomposition** of functions.

Sometimes we reason backwards to find the functions which went onto a composition. This process is called decomposition.

Problem 3. Using your knowledge of the absolute value function, explain in a few sentences the relationship between the graph of $y = |\sin(x)|$ and the graph of $y = \sin(x)$.

The graphs coincide when $\sin(x) \geq 0$, i.e., on the intervals

$$[0, \pi], [2\pi, 3\pi], [4\pi, 5\pi], \dots$$

$$[-2\pi, -\pi], [-4\pi, -3\pi], [-6\pi, -5\pi], \dots$$

and the graph is reflected around the x -axis outside the above intervals. The graphs of $|\sin(x)|$ is always non-negative.

Problem 4. Use a graph to decide whether or not the following functions are invertible.

(a) $y = x^6 + 2x^2 - 10$

No

(b) $y = |x|$

No

(c) $y = e^{x^2}$

No. This function is even.

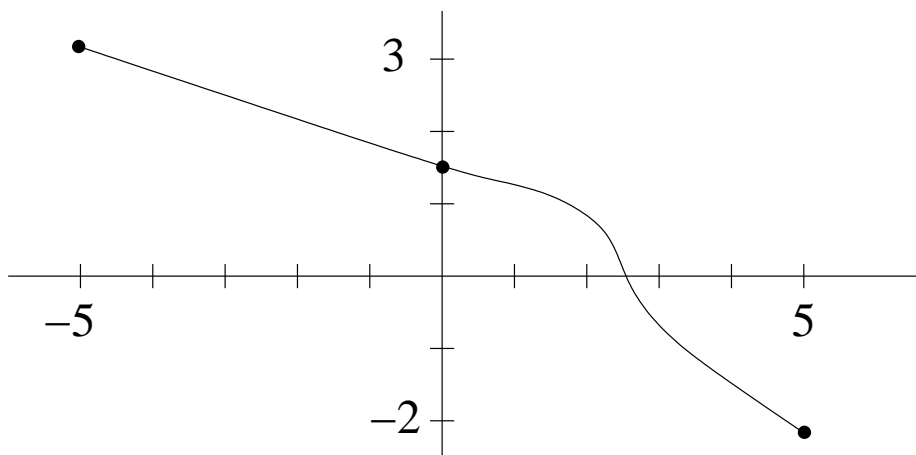
Problem 5. The figure below defines a function f . Rank the following quantities in order from least to greatest: $0, f(0), f^{-1}(0), f(3), f^{-1}(3)$.

Based on the graphs, the approximate values are

$$f(0) \approx 1.5, f^{-1}(0) \approx 2.5, f(3) \approx -1, f^{-1}(3) \approx -5,$$

and so the order is

$$f^{-1}(3), f(3), 0, f(0), f^{-1}(0)$$



Problem 6 Briefly explain what a combination of functions is.

A combination of functions is when you add, subtract, multiply or divide two or more functions.