

Name: \_\_\_\_\_

PID: \_\_\_\_\_

NOTE: You must show the steps necessary to arrive at your answer unless otherwise noted. Use your judgment, if you can't do the entire problem in your head, then you probably should write down at least some intermediate steps.

This assignment has 12 pages. There are 48 total points.

**Problem 1** (8 points). Consider the function  $f(x) = (0.4)^x$ .

(a) What is the domain of  $f(x)$ ?

(b) What is the range of  $f(x)$ ?

(c) Determine a formula for the inverse of  $f(x)$ .

(d) Does the graph of  $f(x)$  have any asymptotes? Where?

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- (e) Does the graph of  $f(x)$  have any vertical intercepts? If so, write your answer as a coordinate pair.
- (f) Does the graph of  $f(x)$  have any horizontal intercepts? If so, write your answer(s) as a coordinate pair.
- (g) Sketch the graph of  $f(x)$ . Label any intercepts or asymptotes.

**Problem 2** (8 points). Consider the function  $g(x) = -2(0.4)^{x+3}$ .

- (a) What is the domain of  $g(x)$ ?
  
  
  
  
  
  
  
  
  
  
- (b) What is the range of  $g(x)$ ?
  
  
  
  
  
  
  
  
  
  
- (c) Determine a formula for the inverse of  $g(x)$ .
  
  
  
  
  
  
  
  
  
  
- (d) Does the graph of  $g(x)$  have any asymptotes? Where?
  
  
  
  
  
  
  
  
  
  
- (e) Does the graph of  $g(x)$  have any vertical intercepts? If so, write your answer as a coordinate pair.
  
  
  
  
  
  
  
  
  
  
- (f) Does the graph of  $g(x)$  have any horizontal intercepts? If so, write your answer(s) as a coordinate pair.

(g) Sketch the graph of  $g(x)$ . Label any intercepts or asymptotes.

**Problem 3** (8 points). Consider the function  $h(x) = \log_6(x)$ .

- (a) What is the domain of  $h(x)$ ?
  
  
  
  
  
  
  
  
  
  
- (b) What is the range of  $h(x)$ ?
  
  
  
  
  
  
  
  
  
  
- (c) Determine a formula for the inverse of  $h(x)$ .
  
  
  
  
  
  
  
  
  
  
- (d) Does the graph of  $h(x)$  have any asymptotes? Where?
  
  
  
  
  
  
  
  
  
  
- (e) Does the graph of  $h(x)$  have any vertical intercepts? If so, write your answer as a coordinate pair.
  
  
  
  
  
  
  
  
  
  
- (f) Does the graph of  $h(x)$  have any horizontal intercepts? If so, write your answer(s) as a coordinate pair.

(g) Sketch the graph of  $h(x)$ . Label any intercepts or asymptotes.

**Problem 4** (8 points). Consider the function  $k(x) = 2 \log_6(x - 2) + 4$ .

- (a) What is the domain of  $k(x)$ ?
  
  
  
  
  
  
  
  
  
  
- (b) What is the range of  $k(x)$ ?
  
  
  
  
  
  
  
  
  
  
- (c) Determine a formula for the inverse of  $k(x)$ .
  
  
  
  
  
  
  
  
  
  
- (d) Does the graph of  $k(x)$  have any asymptotes? Where?
  
  
  
  
  
  
  
  
  
  
- (e) Does the graph of  $k(x)$  have any vertical intercepts? If so, write your answer as a coordinate pair.
  
  
  
  
  
  
  
  
  
  
- (f) Does the graph of  $k(x)$  have any horizontal intercepts? If so, write your answer(s) as a coordinate pair.

- (g) Sketch the graph of  $k(x)$ . Label asymptotes, but you do *not* need to label intercepts for this problem.



**Problem 5** (8 points). Consider the function  $s(x) = \cos(x)$ .

- (a) What is the domain of  $s(x)$ ?
  
  
  
  
  
  
  
  
  
  
- (b) What is the range of  $s(x)$ ?
  
  
  
  
  
  
  
  
  
  
- (c) Determine a formula for the inverse of  $s(x)$  (this is not a trick question, see Chapter 6.3).
  
  
  
  
  
  
  
  
  
  
- (d) Does the graph of  $s(x)$  have any asymptotes? Where?
  
  
  
  
  
  
  
  
  
  
- (e) Does the graph of  $s(x)$  have any vertical intercepts? If so, write your answer as a coordinate pair.
  
  
  
  
  
  
  
  
  
  
- (f) Does the graph of  $s(x)$  have any horizontal intercepts? If so, write your answer(s) as a coordinate pair.

(g) Sketch the graph of  $s(x)$ . Label intercepts or asymptotes in a clear way.

**Problem 6** (8 points). Consider the function  $r(x) = -\cos(3x) + 5$ .

- (a) What is the domain of  $r(x)$ ?
  
  
  
  
  
  
  
  
  
  
- (b) What is the range of  $r(x)$ ?
  
  
  
  
  
  
  
  
  
  
- (c) Determine a formula for the inverse of  $r(x)$ .
  
  
  
  
  
  
  
  
  
  
- (d) Does the graph of  $r(x)$  have any asymptotes? Where?
  
  
  
  
  
  
  
  
  
  
- (e) Does the graph of  $r(x)$  have any vertical intercepts? If so, write your answer as a coordinate pair.
  
  
  
  
  
  
  
  
  
  
- (f) Does the graph of  $r(x)$  have any horizontal intercepts? If so, write your answer(s) as a coordinate pair.

(g) Sketch the graph of  $r(x)$ . Label intercepts or asymptotes in a clear way.