

QUIZ 1B

(CHAPTER 1: FUNCTIONS)
 MATH 141 – FALL 2016 – KUNIYUKI
 60 POINTS TOTAL

No notes or books allowed. A scientific calculator is allowed.

You may assume that two-dimensional graphs are in the usual Cartesian xy -plane. Give exact answers, unless you are told to approximate.

SHORTER PROBLEMS (30 POINTS TOTAL)

1) (5 points). Write the domain of f , where $f(x) = \frac{\sqrt{x+2}}{x-3}$, using interval form, the form using parentheses and/or brackets.

2) (3 points). Find **and box in** the x -intercept(s) (if any) of the graph of $y = \frac{\sqrt{x^2 - 25}}{x - 5}$ in the usual xy -plane. If there are none, write “NONE.”

3) (4 points total). Box in the appropriate answers.

a) The graph of $y = x^5 - 2x$ in the usual xy -plane is symmetric about ...
 the x -axis the y -axis the origin (none of these)

b) If $g(t) = t^{2/3} + 5$, then g is ...
 even odd neither

4) (6 points total). If the point $(1, -5)$ lies on the graph of $y = f(x)$, where f is a one-to-one function, what point must then lie on the graph of ...

a) ... $y = f(x - 1) + 4$?

b) ... $y = -f(x) - 2$?

c) ... $y = f^{-1}(x)$?

5) (2 points). Evaluate $\lceil \lceil -7.1 \rceil \rceil$. (This is the same as $\lfloor -7.1 \rfloor$.)

6) Match the equations with their corresponding graphs by writing the appropriate letters in the blanks. The x - and y -axes are not necessarily scaled the same way. (6 points total)

The graph of $y = \frac{1}{x}$ is Graph _____.

The graph of $y = \frac{1}{x^2}$ is Graph _____.

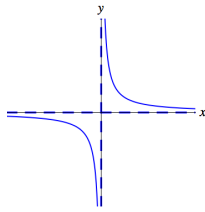
The graph of $y = \sqrt[3]{x}$ is Graph _____.

The graph of $y = x^{2/3}$ is Graph _____.

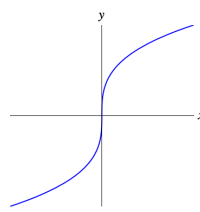
The graph of $y = \sqrt{16 - x^2}$ is Graph _____.

The graph of $y = |x|$ is Graph _____.

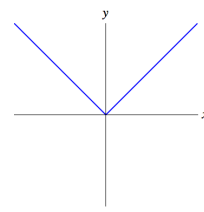
Graph A



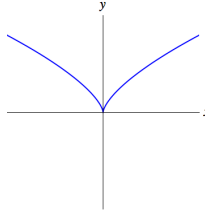
Graph B



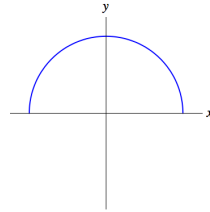
Graph C



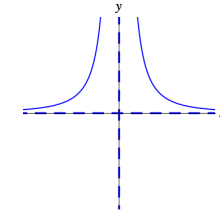
Graph D



Graph E



Graph F



7) (2 points). Find functions g and f such that $(f \circ g)(x) = \sqrt[3]{x^2 + 1}$.

You may not use the identity function. Fill in the blanks:

$$g(x) = \underline{\hspace{2cm}} \qquad f(u) = \underline{\hspace{2cm}}$$

8) (2 points). Sketch the graph of $x = -y^2$ in the usual xy -plane.

LONGER PROBLEMS (30 POINTS TOTAL)

Show all work, simplify as appropriate, and use “good form and procedure” (as in class).
Box in your final answers!

9) Let $s(t) = t^3 - 2t$. Find the average rate of change of s from $t = 1$ to $t = 4$.

Assume that t is time measured in seconds and $s(t)$ is the position of a particle measured in meters. Write the appropriate unit in your final answer.

Note: You are finding the average velocity of the particle between $t = 1$ second and $t = 4$ seconds. (7 points)

10) f is the function defined piecewise by: $f(x) = \begin{cases} x^2 + 1, & -2 \leq x \leq 1 \\ \sqrt{x-1}, & 1 < x < 5 \end{cases}$. (13 pts.)

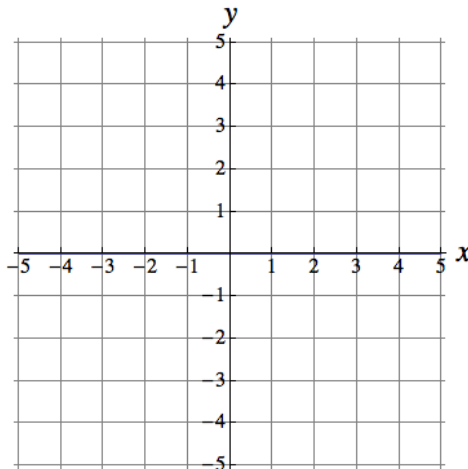
a) Evaluate $f(-2)$. (1 point)

b) Evaluate $f(1)$. (1 point)

c) Evaluate $f(2)$. (1 point)

d) Graph $y = f(x)$ on the grid below. Be as accurate as possible.

Clearly indicate whether endpoints are included or excluded. (6 points)



e) Give the **domain** of the function f using interval form (the form with parentheses and/or brackets). (2 points)

f) Give the **range** of the function f using interval form (the form with parentheses and/or brackets). (2 points)

11) Let $f(x) = \sqrt{x}$. Simplify the difference quotient completely:

$$\frac{f(x+h) - f(x)}{h}$$

Hint: You will need to rationalize a numerator. (10 points)