

QUIZ 1B

(CHAPTER 1: FUNCTIONS)
 MATH 141 – SPRING 2019 – 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 (21 POINTS)

1) (3 points). Write the domain of f , where $f(x) = \frac{x-2}{\sqrt{x+7}} + \sqrt[3]{x}$, using interval form (the form with parentheses and/or brackets).

2) (2 points). Fill in the blank: An equation for the graph that results when the graph of $y = \sqrt[3]{x}$ is moved five units to the left and three units downward is given by:

$$y = \underline{\hspace{4cm}}.$$

3) (1 point). Evaluate $\lceil\lceil -2.3 \rceil\rceil$. (This is the same as $\lfloor\lfloor -2.3 \rfloor\rfloor$.)

4) (2 points). Find functions g and f such that $(f \circ g)(x) = (3x - 5)^4$.

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

$$g(x) = \underline{\hspace{4cm}} \qquad f(u) = \underline{\hspace{4cm}}$$

5) (2 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

6) (2 points). If the point $(-1, 4)$ 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 $y = f^{-1}(x)$?

- 7) (6 points). 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.

The graph of $y = \sqrt{9 - x^2}$ is Graph ____.

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

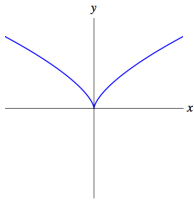
The graph of $y = \sqrt[3]{x}$ is Graph ____.

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

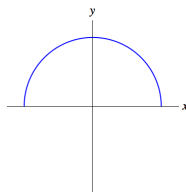
The graph of $y = \frac{1}{x}$ is Graph ____.

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

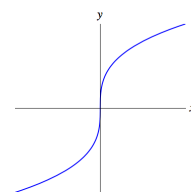
Graph A



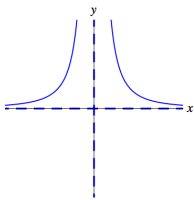
Graph B



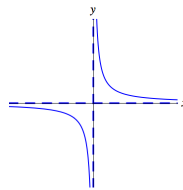
Graph C



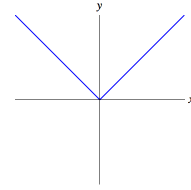
Graph D



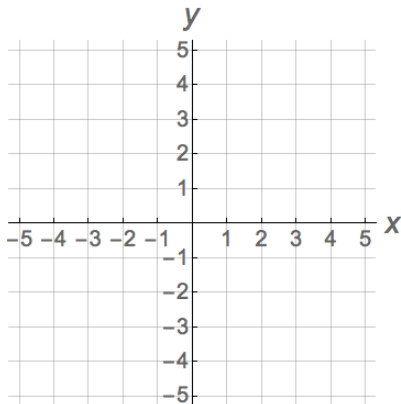
Graph E



Graph F



- 8) (2 points). Graph $x = -y^2$ on the grid below.



- 9) (1 point). Let $f(x) = \frac{x}{3}$. What is $f^{-1}(x)$?

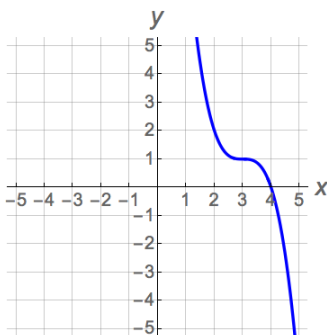
LONGER PROBLEMS (39 POINTS)

Show all work, simplify as appropriate, and use “good form and procedure” (as in class).

Box in your final answers!

- 10) Find **and box in** the x -intercept[s] (if any) of the graph of $y = \sqrt{\frac{3x^2 - 8x + 2}{x - 5}}$ in the usual xy -plane. If there are none, write “NONE”. (7 points)

- 11) The graph below is obtained by taking a basic graph from Section 1.3 and applying rigid transformations. Find an equation for the graph. (5 points)



Fill in the blank: $y =$ _____ .

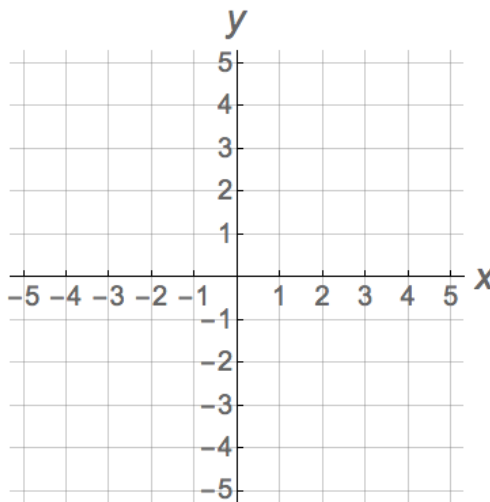
12) f is the function defined piecewise by: $f(x) = \begin{cases} x^2 + 1, & -2 \leq x \leq 1 \\ \sqrt{x-1}, & 1 < x < 5 \end{cases}$. (11 pts.)

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

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

c) Evaluate $f(6)$. (1 point)

d) Graph $y = f(x)$ on the grid below. Be accurate. Clearly indicate whether endpoints are included or excluded, as in class. (6 points)



e) Give the **domain** of the function f using interval form (the form with parentheses and/or brackets). (1 point)

f) Give the **range** of the function f using interval form (the form with parentheses and/or brackets). (1 point)

13) Let $f(x) = 4x^3 - x$. Find the average rate of change of f from $x = 2$ to $x = 6$. Assume that x is length measured in inches and $f(x)$ is cost measured in dollars. Write the appropriate unit in your final answer. (7 points)

14) Let $f(x) = \frac{3}{x}$. Simplify the difference quotient completely: (9 points)

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