Math 141 Name: _____

QUIZ 1B

(CHAPTER 1: FUNCTIONS)
MATH 141 – FALL 2026 – KUNIYUKI
68 POINTS TOTAL, BUT 60 POINTS = 100%

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 (34 POINTS)

1) (4 points). Write the domain of f, where $f(x) = \frac{1}{\sqrt{x+3}} + \sqrt[3]{x-7}$, 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) (1 point). The graph of $y = 2x^5 + 3x^3 - x$ is symmetric about … (Box in one:)

the x-axis the y-axis the origin (none of these)

4) (1 point). If the point $(-5, 4)$ lies on the graph of $y = f(x)$, what other point must also lie on the graph if f is an **even** function?

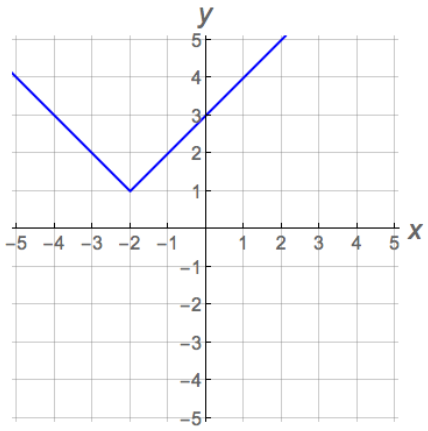
5) (6 points total). If the point $(1, -5)$ lies on the graph of $y = f(x)$, where f is a one-to-one function, what point must then lie on the graph of …

a) … $y = f(x-1) + 4$?

b) … $y = -f(x)$?

c) … $y = f^{-1}(x)$?

6) (4 points). The graph below is obtained by taking a basic graph from Section 1.3 and applying rigid transformations. Find an equation for the graph.



Fill in the blank: $y =$ _____.

7) (1 point). Evaluate $[\![-7.1]\!]$. (This is the same as $\lfloor -7.1 \rfloor$.)

8) (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 $y = \dfrac{1}{x}$ is Graph ____.

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

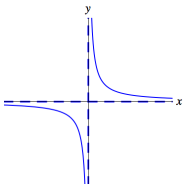
The graph of $y = |x|$ is Graph ____.

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

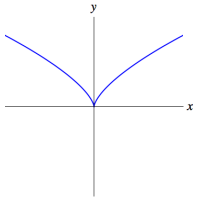
The graph of $y = x^{2/3}$ is Graph ____.

The graph of $y = \sqrt{4 - x^2}$ is Graph ____.

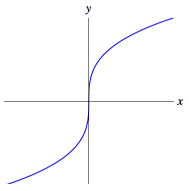
Graph A



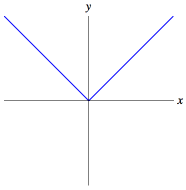
Graph B



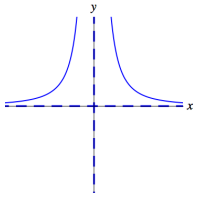
Graph C



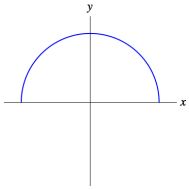
Graph D



Graph E



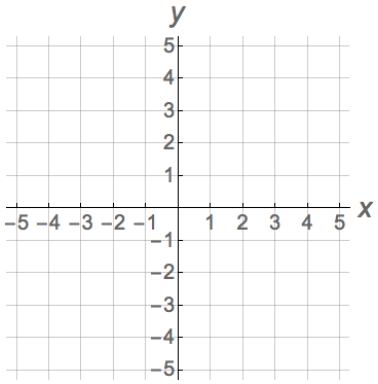
Graph F



9) (2 points). Find functions g and f such that $\left(f \circ g\right)\left(x\right) = \sqrt[3]{x^2+1}$.
You may not use the identity function. Fill in the blanks:

$g\left(x\right) =$_____ $f\left(u\right) =$_____

10) (2 points). Graph $x = -y^2$ on the grid below.



11) (4 points). Let $f\left(x\right) = x^3 + 1$. What is $f^{-1}\left(x\right)$?

LONGER PROBLEMS (34 POINTS)

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

12) 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. (The particle is moving along a coordinate line.) Write the appropriate unit in your final answer. Show all work, as in class!

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

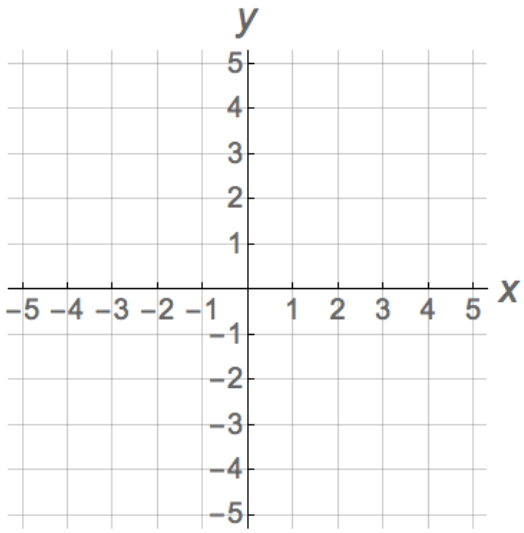
13) f is the function defined piecewise by: $f(x)=\begin{cases} x^2-1, & -2\le x<2 \\ 1-x, & x\ge 2 \end{cases}$. (18 points)

a) Evaluate $f(-3)$. (2 points)

b) Evaluate $f(-2)$. (2 points)

c) Evaluate $f(2)$. (2 points)

d) Graph $y=f(x)$ on the grid below. Be accurate. Clearly indicate whether endpoints are included or excluded, as in class. (7 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). (3 points)

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

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

Show all work!
Hint: You will need to rationalize a numerator. (9 points)