Math 141 Name: _____

QUIZ 1B

(CHAPTER 1: FUNCTIONS)
MATH 141 – FALL 2018 – 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 (25 POINTS)

1) (5 points). Write the domain of f, where $f\left(r\right)=\dfrac{\sqrt{r-5}}{r-7}+\sqrt[3]{r}$, using interval form (the form using parentheses and/or brackets).

2) (1 point). The graph of $y=x^6-3x^2+5$ is symmetric about the… (Box in one:)

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

3) (1 point). The graph of $y=\sqrt[3]{x}+\dfrac{1}{x}$ is symmetric about the … (Box in one:)

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

4) (1 point). Evaluate $\left[\!\left[-4.2\right]\!\right]$. (This is the same as $\lfloor -4.2 \rfloor$.)

5) (6 points total). If the point $\left(5,2\right)$ lies on the graph of $y=f\left(x\right)$ in the usual *xy*-plane, where f is a one-to-one function, what point must then lie on the graph of …

a) … $y=f\left(x+3\right)-1$?

b) … $y=-f\left(x\right)$?

c) … $y=f^{-1}\left(x\right)$?

6) (2 points). Find functions g and f such that $\left(f\circ g\right)\left(x\right)=\dfrac{1}{x-3}$.

You may <u>not</u> use the identity function. Fill in the blanks:

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

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

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

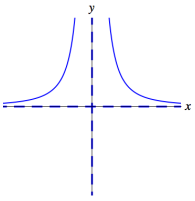
The graph of $y = \dfrac{1}{x}$ is Graph _____.

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

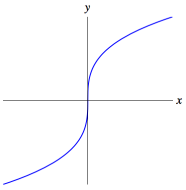
The graph of $y = |x|$ is Graph _____.

The graph of $y = \sqrt{49 - x^2}$ is Graph _____.

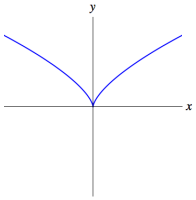
Graph A



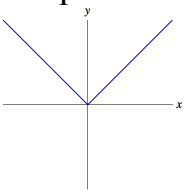
Graph B



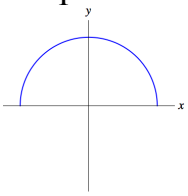
Graph C



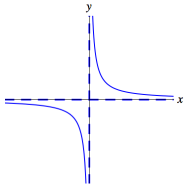
Graph D



Graph E

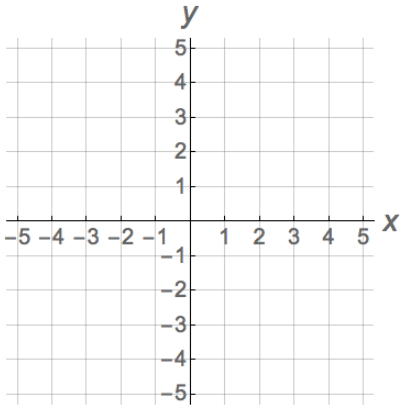


Graph F



8) (1 point). Let $f(x) = x + 4$. What is $f^{-1}(x)$?

9) (2 points). Graph $x = y^2 + 1$ on the grid below.



LONGER PROBLEMS (35 POINTS)

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

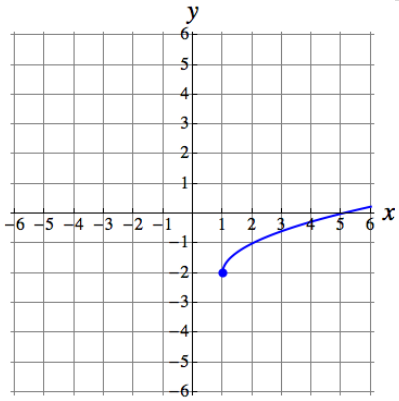
10) Let $f(x)=\dfrac{2-x}{3x^2-5x-2}$. Parts a), b), and c) below use this. (6 points total)

a) Simplify: $\dfrac{2-x}{3x^2-5x-2}$. (4 points)

b) Find **and box in** the x-intercept(s) (if any) of the graph of $y=f(x)$. If there are none, write "NONE." (1 point)

c) Find **and box in** the y-intercept (if any) of the graph of $y=f(x)$. If there is none, write "NONE." (1 point)

11) Fill in the blank: The graph below has equation $y=$ _____.
Hint: The graph is obtained by translating a basic graph from class. (4 points)



12) Let $s(t)=2t^3+7t$. Find the average rate of change of s from $t=-3$ 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.
Note: You are finding the average velocity of the particle between $t=-3$ seconds and $t=4$ seconds; we are allowing negative values for t. (6 points)

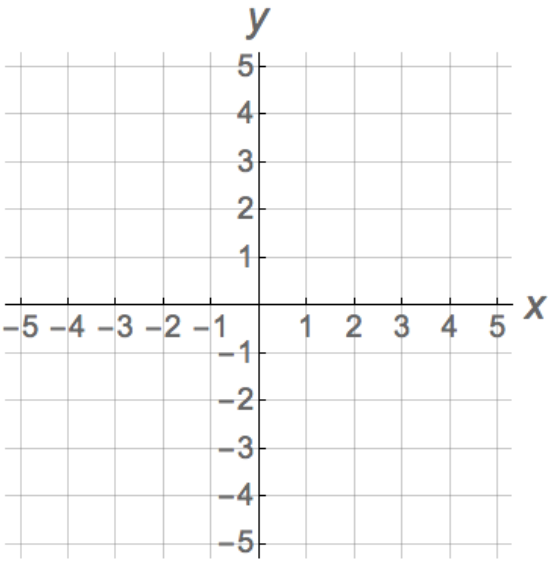
13) f is the function defined piecewise by: $f(x)=\begin{cases}3x+2, & -2\le x<0\\ (x-1)^2, & x\ge 0\end{cases}$.

(10 points)

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

b) Evaluate $f(3)$. (1 point)

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



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

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

14) Let $f(x) = x^2 - 7x + 4$. Simplify the difference quotient completely: (9 points)

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