

**MATH 1050-006**  
**Practice exam 1**

Question:	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Points:	6	8	12	6	4	2	2	2	2	2	8	2	24	80
Score:														

1. 6 points Decide whether the following statements are true or false.

- (a) \_\_\_\_\_  $\sqrt{2} \in \mathbb{Q}$ .
- (b) \_\_\_\_\_  $-\frac{9}{3} \in \mathbb{Q} - \mathbb{Z}$ .
- (c) \_\_\_\_\_  $[0, 1] - \{1\} = [0, 1)$

2. 8 points Decide whether the following sequences are arithmetic or geometric *or neither*

(a) 1,-10,100,-1000,...

(b) 4,44,444,4444,...

(c) 7,3,-1,-5,...

(d) 1,-1,1,-1,..

3. 12 points ~~Calculate the following sums.~~

(a) What's the 101 term of 2, 5, 8, 11, ...?

*Answer the following questions  
or calculate the following sums*

(b) What's the 299 term of  $1, \frac{1}{10}, \frac{1}{100}, \frac{1}{1000}, \dots$ ? (Need a formula involving numbers. No need to compute.)

(c)  $\sum_{i=1}^{\infty} \frac{5}{3^i}$

(d)  $\sum_{i=1}^3 1/i^2$

(e)  $\sum_{i=1}^{200} (5i - 1)$

(f)  $\sum_{i=1}^4 (i^3 + 1)$

4. 6 points Find the implied domains of the following expressions:

(a)  $\frac{x-1}{2x+3}$

(b)  $\frac{x^5 + x^7 - 1}{9}$

~~(c)~~  $\frac{1}{x(x-4)(x+6)}$

5. 4 points Expand the following expression and show the actual numbers for all the coefficients.

(a)  $(x - 2)^5$

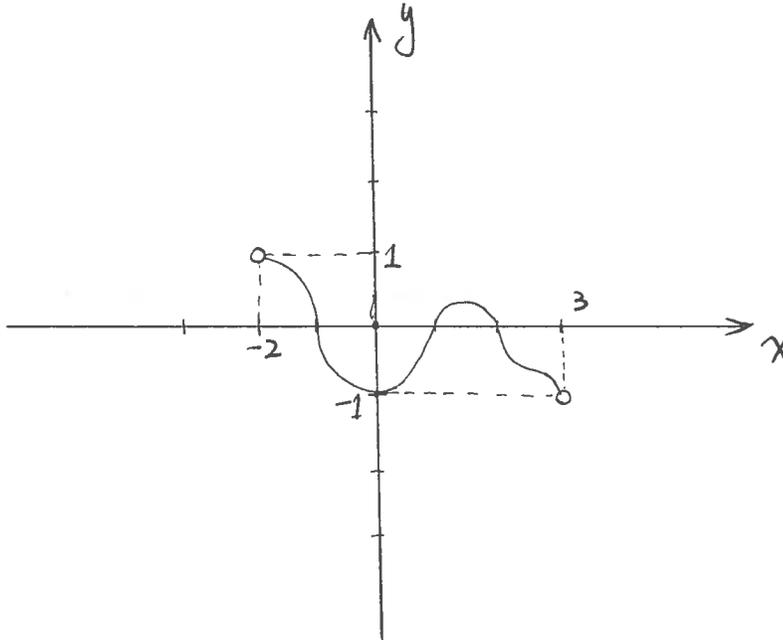
(b)  $(1 + x)^7$

6. 2 points If  $f(x) = 4x + 1$  and  $g(x) = x^2 + 3$ , then what is  $g \circ f(x)$ ? (Need an expression for  $g \circ f$ . Show a computable formula of  $x$  that a calculator could work on. But no need to expand and compute.)

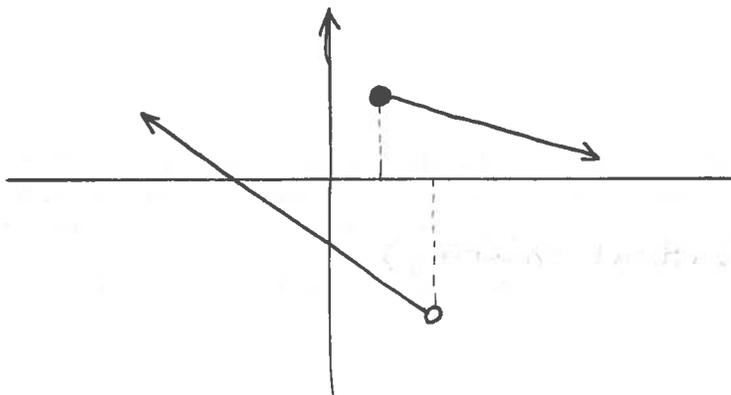
7. 2 points While in the grocery shop you learn that the store is offering 4 cleaning items for 5 dollars. There are 20 items to choose from. You plan to spend 10 dollars in cleaning products. How many different combinations of items can you take home?? (No need to compute the final number)

8. 2 points How many different ways are there to order 10000 books in a library? (No need to compute the final number)  
*(or without ordering)*

9. 2 points A basketball team has 12 players. There are five different positions on a basketball team. A starting lineup consists of five players, each assigned to one of the five positions. How many different ways can a coach select a starting lineup? *(order matters)*
10. 2 points How many ways are there to choose 3 candies from a bag of 5, and give them to 3 kids? *(order matters)*
11. 8 points Decide the x-intercepts(if any), y-intercept(if any), domain and the range of the following graphs of functions.



12. 2 points Is the picture below the graph of a function?



13. 24 points Graph the following functions as precisely and clearly as possible, and mark the coordinates of their intersection with x- and y- axis' (if any):

(a)  $id$

(b)  $f : \mathbb{R} \rightarrow \mathbb{R}, f(x) = -x + 2$

(c)  $f : \mathbb{R} \rightarrow \mathbb{R}, f(x) = x^2$

(d)  $f : \mathbb{R} \rightarrow \mathbb{R}, f(x) = (x - 1)^3$

(e)  $f : \mathbb{R} - \{0\} \rightarrow \mathbb{R}, f(x) = -\frac{1}{x^3}$

(f)  $f : \mathbb{R} - \{0\} \rightarrow \mathbb{R}, f(x) = \frac{1}{x^2}$

(g)  $f : \{-1, 0, 1\} \rightarrow \mathbb{R}, f(x) = 2x + 2$

(h)  $f : \{-2, 1\}, f(x) = x^2$

~~$f : \{-2, 1\}, f(x) = x^2$~~   
 $[-2, 1) \rightarrow \mathbb{R}$

