

# QUIZ 1A

(CHAPTER 0: PRELIMINARY TOPICS)  
MATH 141 – FALL 2016 – KUNIYUKI  
90 POINTS TOTAL

No notes or books allowed. A scientific calculator is allowed. Simplify as appropriate.

Check one:

Can you easily print files from the class website?

  

Yes. I can print exam solutions.

No. Give me exam solutions in class.

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

## SHORTER PROBLEMS

**(41 POINTS: 2 POINTS EACH, UNLESS OTHERWISE SPECIFIED)**

1) (6 points total).

a) Write the **converse** of this given statement:

“If I am in a study group, then I deserve a good grade.”

b) Write the **contrapositive** of this given statement:

“If I am in a study group, then I deserve a good grade.”

c) Which is logically equivalent to the given statement? Box in one:

Its converse

Its inverse

Its contrapositive

2) The symbol  $\in$  means which of the following? Box in one:

For all

There exists

Is a member of

3) Mathematically express the following as an absolute value inequality:

The distance between  $x$  and 2 on the real number line is less than 5.

4) (4 points). Solve the absolute value inequality in Problem 3); that is, solve the answer to Problem 3). Write the solution set in interval form (the form with parentheses and/or brackets).



### **LONGER PROBLEMS (49 POINTS TOTAL)**

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

14) Simplify  $\left(\frac{2x^2x^7}{x^4}\right)^3$  completely. Your final answer must not have any negative exponents. (5 points)

15) Simplify completely:  $\frac{x^3 + 27}{2x^2 + 5x - 3}$ . (7 points)

16) (4 points). Fill in the boxes below with simplified real numbers to make the statement correct.

$$\frac{4 - x^2}{\sqrt{x}} = 4x \boxed{\phantom{00}} - x \boxed{\phantom{00}} \quad (x > 0)$$

17) Find the **particular** model equation representing the following:  
 $t$  is directly proportional to  $p$  and inversely proportional to the cube of  $q$ ,  
where  $t$  is 3 when  $p$  is 4 and  $q$  is 2.

Make sure your model is in simplified form. Do not leave compound fractions in your final answer.

(By “particular,” we mean determine the constant of proportionality.)  
(6 points)

18) For parts a), b), and c), consider the points  $P(-2, 3)$  and  $Q(2, 8)$  in the usual  $xy$ -plane. Write all numerical constants in simplest form. Distance is measured in meters. (18 points total)

a) Find the distance between the two points (that is, the length of the line segment  $\overline{PQ}$ ). (5 points)

b) Use part a) to find the standard form of the equation of the circle centered at the point  $P(-2, 3)$  and passing through the point  $Q(2, 8)$ . (4 points)

c) Find the Slope-Intercept Form of the equation of the line  $\overleftrightarrow{PQ}$  that passes through the two points  $P$  and  $Q$ . Hint: You can do this part without using parts a) and b). (9 points)

- 19) Simplify the following expression completely, as we have done in class. Your final answer must be a single non-compound fraction with no nonpositive exponents. (You do not have to rationalize denominators.) You may ignore domain issues here. (9 points)

$$\frac{x^3 \left[ \frac{1}{2} (9 - x^2)^{-1/2} (-2x) \right] - (\sqrt{9 - x^2})(3x^2)}{x^6}$$